User Guide
hp Integrity Superdome
hp 9000 Superdome

Sixth Edition

Manufacturing Part Number: A5201-96044
February 2005

USA

Legal Notices

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Preface

Scope

This document is intended for viewing by hp customers and covering the new hp Integrity Superdome and hp 9000 Superdome systems.

This document does not describe system software or partition configuration operations in any detail. For detailed information concerning those topics refer to the *hp System Partitions Guide* (5990-8170A).

Book Layout

This document contains the following chapters and appendices:

- Chapter 1, Overview—Brief introduction to the hp Integrity Superdome
- Chapter 2, Installing the System—Unpacking, installation, and preparation for booting the operating system
- Chapter 3, Removing and Replacing Components—Changing field-replaceable units (FRUs)
- Chapter 4, System Specifications—Details of the hp Integrity Superdome
- Chapter 5, Site Preparation—Preparation of the customer's site before installation of the hp Integrity Superdome

In addition, the following appendices provide supplemental material.

- Appendix A, Operating System Boot and Shutdown—Describes how to power down and power up the server.
- Appendix B, Powering On and Off the System—Describes how to power on and off the system, tasks required in several section of this document.
- Appendix C, EFI Boot Maintenance Manager for hp Integrity Superdome—Describes the new EFI boot manager.
- Appendix D, Configuration—Provides allowable configurations.
- Appendix E, Replaceable Parts—A list of all available field replaceable units (FRUs)
- Appendix F, Management Processor Commands—Details on each MP commands
- Appendix G, JUST Exploration Tooll—Useful for troubleshooting, installations, and upgrades
- Appendix H, Templates—Useful for planning customer installations.

Revision History

Table 1 Revisions

Part Number	Edition	Summary of Changes
A5201-10025	First	Initial Release. September 2003
A5201-96025	Second	Released March, 2004. Includes updates for PA-8800, PA-RISC processor for hp9000 Superdome, plus numerous additions and corrections. Moved power on and off procedures to Appendix B.
A5201-96029	Third	Released June, 2004. Includes updates for dual-core IPF processor forhp Integrity Superdome.
A5201-96034	Fourth	Released September, 2004. Added general corrections and updates. Removed troubleshooting chapter.
A5201-96039	Fifth	Released November 2004. Updated upgrade chapter.
A5201-96044	Sixth	Released February 2005. Updated remove and replace chapter and FRU list.

1 Overview

The Superdome family of high-end computers has two new members: hp Integrity Superdome and hp 9000 Superdome. Improvements over the Superdome predecessors include higher processor performance, increased local cell board memory bandwidth, and increased scalability. The hp Integrity Superdome uses the Itanium® 2 single- and dual-core processors, and the hp 9000 Superdome uses the dual-core PA-8800.

The biggest differences between hp Integrity Superdome servers or hp 9000 Superdome servers and earlier Superdome family products include (but are not limited to):

- Cell board design using either of the following processors:
  1. Itanium® 2 single- and dual-core for hp Integrity Superdome
  2. PA-8800 PA-RISC dual processor for hp 9000 Superdome
- Firmware packages.
  - — Management Processor
  - — CLU—clocks, I^2C bus, and so on.
  - — PM (Environmental monitors)
  - — Core I/O (Console in I/O chassis)
  - — System hp Integrity Superdome (IPF on the cell board)
  - — System hp 9000 Superdome (PA on the cell board)
  - — PDHC (SINC comes on the cell board)
  - — Event dictionary (ED)
- 12-slot PCI-X I/O card cage
- 2-GB DIMMS
- Two optional support Management Stations
  - — Windows-based hp Proliant ML350 G3 (PC-SMS)
  - — HP-UX based hp Server rx2600 (HP-UX SMS)

The hp Integrity Superdome supports HP-UX 11.23 and Windows Server 2003, Datacenter.

The hp 9000 Superdome supports HP-UX 11.11.

Basic System Building Blocks

The basic system building blocks used to configure a hp Integrity Superdome system are as follows:

- Server cabinet
- Support Management Station

Figure 1-2 on page 5 illustrates a typical SD16 or SD32 installation.

Figure 1-3 on page 6 illustrates a typical SD64 installation.

Figure 1-4 on page 7 illustrates a typical SD64 and I/O expansion cabinet installation.

Server Cabinet

The server cabinet is the main building block. An SD64 comprises two server cabinets interconnected.

A single cabinet SD32 may contain up to eight cell boards (32 processors), four I/O card cages, five I/O fans, four system cooling fans, six bulk power supplies, and two PDCAs. Figure 1-1 illustrates the location of these components.

A single cabinet SD16 may contain up to four cell boards, four I/O card cages, five I/O fans, four system cooling fans, four bulk power supplies (BPS), and two Power Distribution Control Assemblies (PDCA). Additionally, to the above, two backplane power supplies provides N+1 for the SD16.

Figure 1-1 Server Cabinet Components

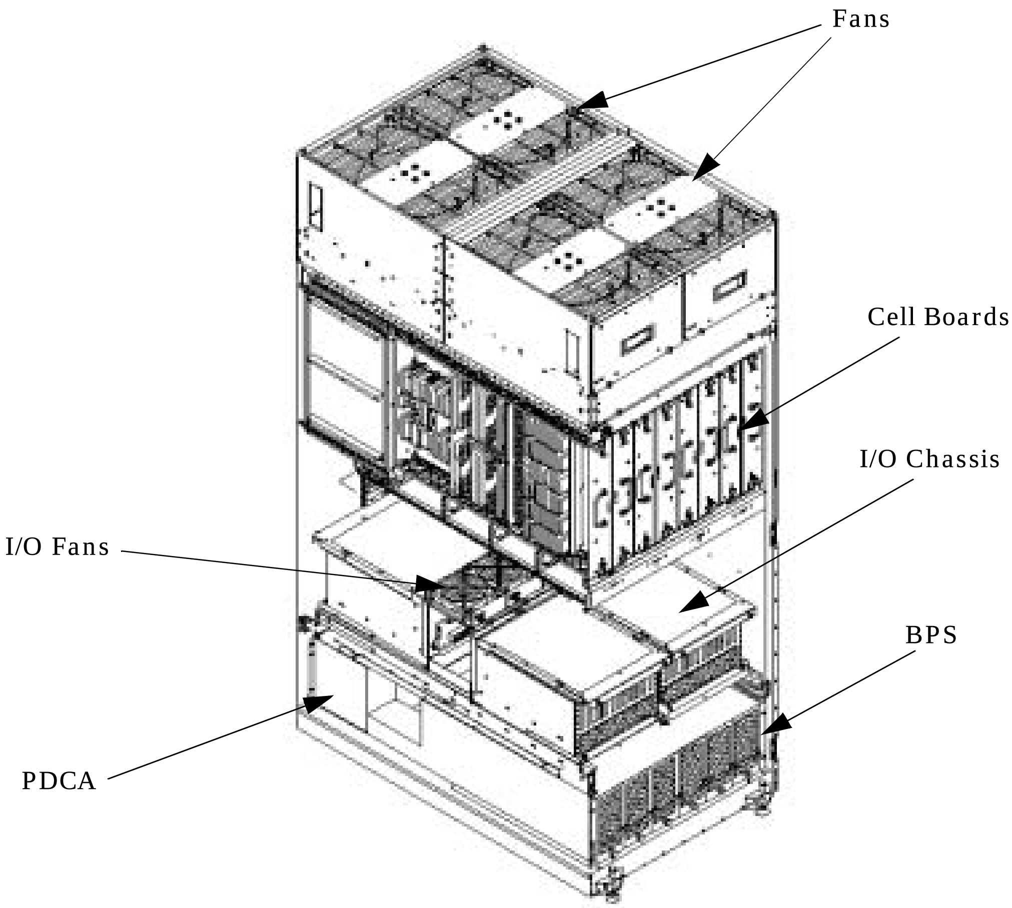


Figure 1-2 Typical SD32 Installation

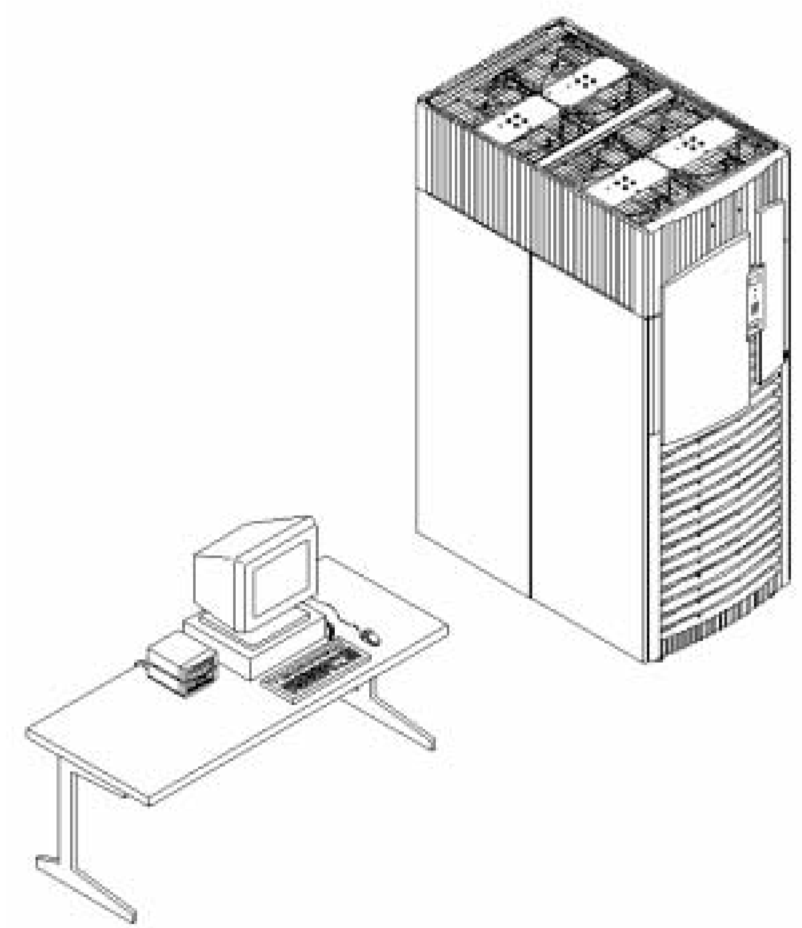


Figure 1-3 Typical SD64 Installation

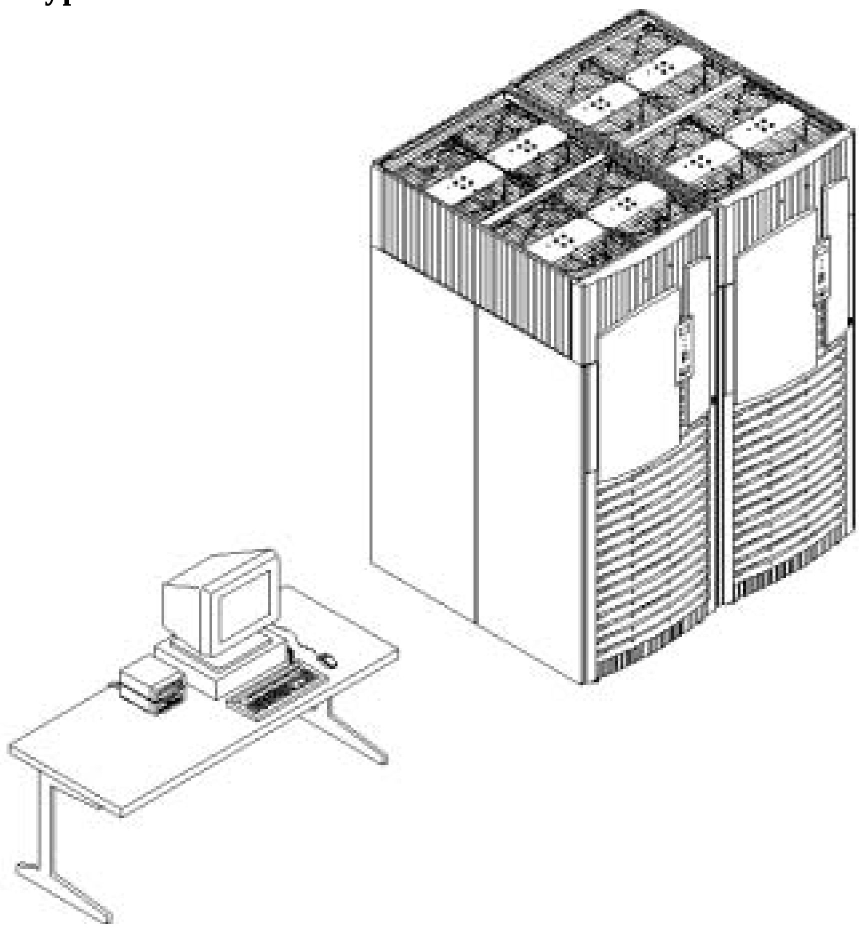
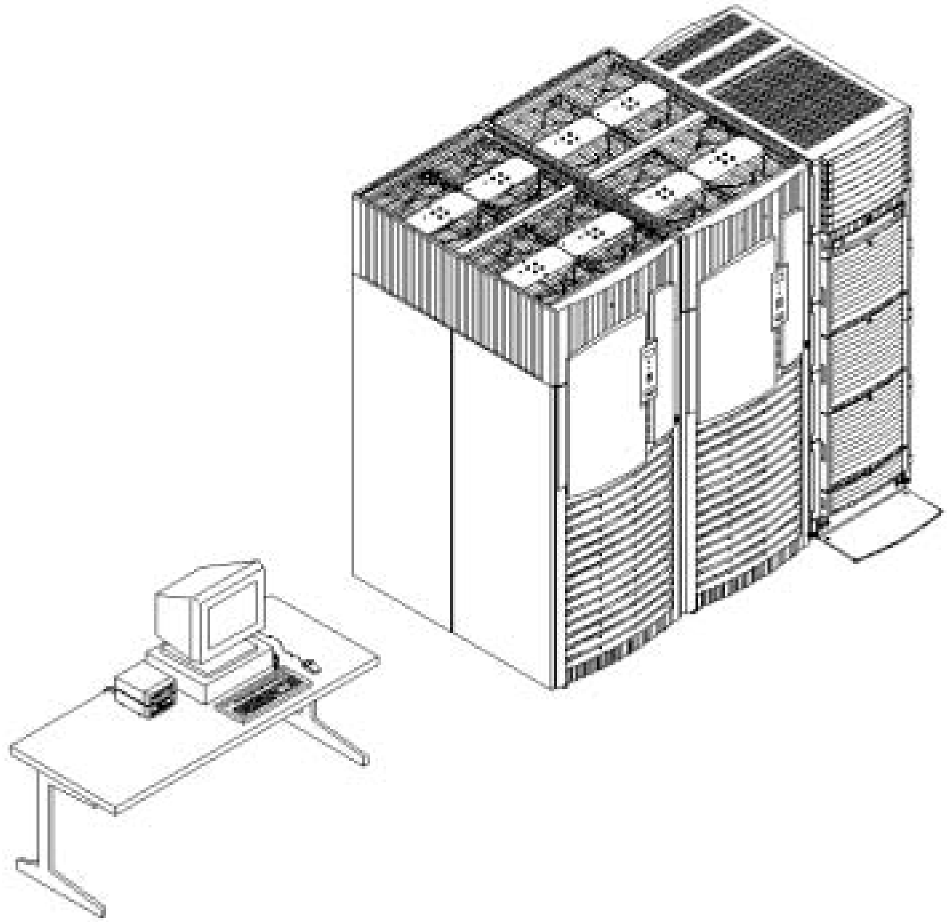


Figure 1-4 Typical Installation with IOX



Support Management Station

The new SMS is an hp Proliant M350-G3 rack-mount version, which includes the TFT-5600 LCD rack-mount display and keyboard.

Configuration Rules

The hp Integrity Superdome and/or hp 9000 Superdome rules for configuration are as follows:

- Single-cabinet system:
  - Two to 32 CPUs per complex with single-core processors
  - Four to 64 CPU cores per complex with dual-core processors
  - Minimum of one cell
  - Maximum of eight cells
- Dual-cabinet system:
  - Six to 64 CPU cores per complex with single core processors
  - Twelve to 128 CPU cores per complex with dual-core processors
  - Minimum of three cells
  - Maximum of 16 cells
- No master/checker support for dual-core processors
- No mixing of processor types within a partition

  Processors running at different frequencies are not allowed within the same partition. Processors with different steppings may not be allowed depending on the stepping changes.

  Each family of Itanium® Processor Family Itanium® 2 processors must be in different partitions.
- Homogeneous cell board population; no mixing of older PA-RISC Superdome cell boards (PA-8700+, PA-8700, or PA-8600) with new Itanium® 2 or PA-8800 cell boards
- No mixing of Itanium® 2 and PA-8800 cell boards in the same complex
- Maximum of 32 DIMMs per cell.
  - 16-GB memory per cell with 128-Mb SDRAMs (512-MB DIMMs).
  - 32-GB memory per cell with 256-Mb SDRAMs (1-GB DIMMs).
  - 64-GB memory per cell with 512-Mb SDRAMs (2-GB DIMMs).
  - DIMM mixing is allowed
- No SCA support.
- Supported I/O subsystems with System Bus Adaptor (SBA) and Local Bus Adaptor (LBA)

Utilities Subsystem

Both types of servers contain a group of boards that together form the Utilities subsystem. These include:

- UGUY
- SBCH—Single Board Computer Hub
- SBC—Single Board Computer
- HUCB—HalfDome Utility Connector Board

UGUY

The UGUY board is a major component of the utility subsystem. It provides the following functions:

- System clocks
- Cabinet power monitor
- Cabinet utility circuits providing scan, reset, and LED driver functions
- Cabinet ID number switch

Every cabinet contains one UGUY. The UGUY plugs into the HUCB. It is not hot swappable. Its MP microprocessor controls power monitor functions, executing the power monitor 3 (PM3) firmware and the cabinet-level utility (CLU) firmware.

SBCH

The SBCH, along with the SBC, forms part of the MP function. It provides the physical and electrical interface to the SBC, the fanning out of the Universal Serial Bus (USB) to internal and external subsystems, and a LAN 10/100BT Ethernet connection. It plugs into the HUCB and is hot swappable. Every CPU cabinet contains one SBCH board, but only one SBCH contains an SBC board used as the MP for the complex. The remaining SBCH boards act as USB hubs.

SBC

The SBC board is an embedded PC running System Utility Board (SUB) firmware. It is the core of the Management Processor and plugs into the SBCH board through a PC104 interface.The SBC provides three external interfaces to the Utility Subsystem:

- LAN (10/100BT Ethernet) for customer console access
- RS232 port for remote access from the response center through a modem
- RS232 port for local console access for manufacturing and field support personnel

The modem function is not included on the SBC and must be external to the cabinet.

HUCB

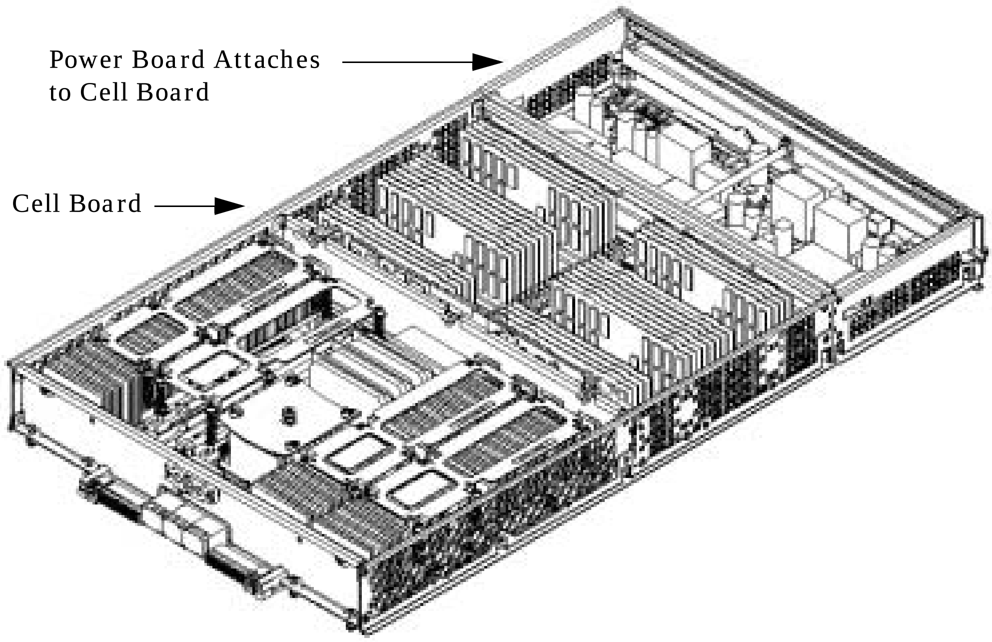
The HUCB is the backplane of the Utility Subsystem. It provides cable distribution for all the utility signals except the clocks. It also provides the customer LAN interface and serial ports. The SMS connects to the HUCB. The system “type” switch is located on the HUCB. There are no active circuits on this board. It is not hot swappable.

Cell Board

The cell board with its firmware is the biggest change to the Superdome family. It provides the processing and memory resources required by each hp Integrity Superdome system configuration. Each cell board uses up to four Itanium® 2 processor modules hp Integrity Superdome) or up to four PA-8800, dual-core, PA-RISC processor modules (hp 9000 Superdome), a single cell (or coherency) controller (CC), a high-speed crossbar interface, a high-speed I/O interface, eight memory controller CCs, capacity for up to 32 high-density DIMMs, high-speed clock-distribution circuitry, a utility subsystem interface, scan (JTAG) circuitry for manufacturing test, and a low-voltage DC power interface. The system backplane accommodates up to eight cell boards allowing up to 32 processor modules and up to 256 DIMMs in a single system cabinet.

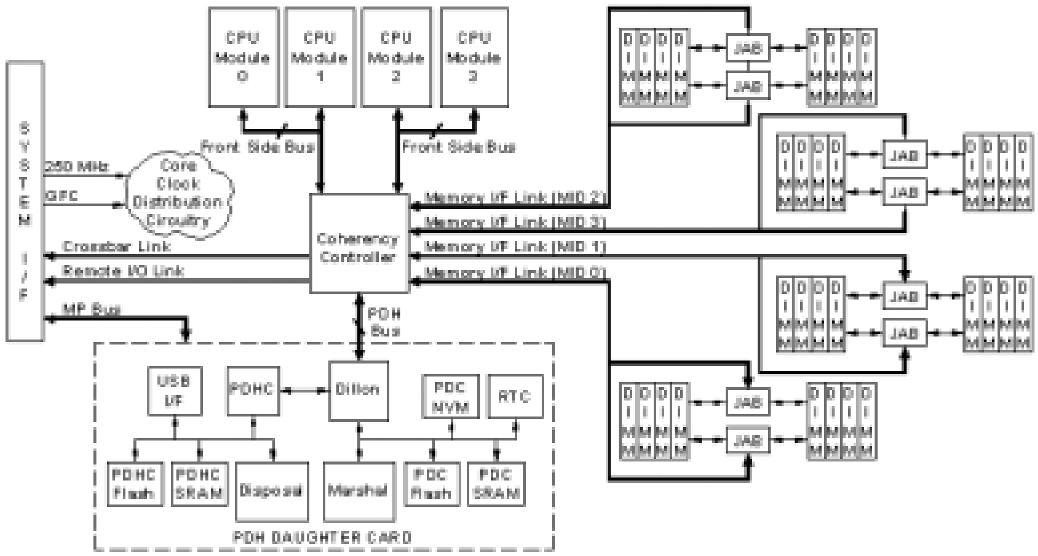
The cell power board (OCPB) is separate from the cell board. An OCPB can attach to any cell board.

Figure 1-5 New hp Integrity Superdome Cell Board



The heart of the cell board, the coherency controller (CC), provides a Front Side Bus (FSB) interface to each of two processor module pairs. The communication bandwidth (6.4 GB/s at 200 MHz) of both FSB interfaces on the CC is, therefore, split between two processor modules. Interfaces external to the cell board provided by the CC constitute a crossbar interface, referred to as the fabric, and a remote I/O subsystem link. The fabric interface allows multiple cell boards to communicate with each other across a self-correcting, high-speed (8 GB/s) communication pathway. The remote I/O link provides a self-correcting, high-speed (2 GB/s) communication pathway between the cell board and the I/O subsystem through a pair of cables. In addition, the CC also provides the cell board with its own interface to the cell board's local memory subsystem.

Figure 1-6 Cell Board Functional Block Diagram



Cell Controller

The CC has five major interfaces:

- Processor (two independent FSBs)
- Crossbar (cell interconnect fabric)
- Remote I/O link
- Memory subsystem
- Platform-dependant hardware (PDH)

Using an internal, centralized data path, the CC maintains cache coherency throughout the system with memory tags. It also has an internal PLL that helps simplify clock distribution within the confines of the ASIC and source additional clocks to the memory and PDH subsystems.

Processors and Front-Side Bus Interfaces

Each of the two FSBs is connected to two processor modules in a standard three-drop FSB configuration. The CC minimizes total routing delay without sacrificing timing skew between the FSB address and data and control signals to achieve a frequency of 200 MHz transmitting data on both edges of the interface clock. With the 128-bit FSB capable of achieving 400 MT/s, a 6.4 MB/s burst data transfer rate can be realized.

Crossbar Link

The crossbar link is a self-correcting, high-speed interface between the CC and the crossbar backplane. It comprises eight data “bundles,” each with a differential strobe for synchronization, designed to achieve a peak data transfer rate of 2 GB/s. Four of the eight bundles are used for input data, and each bundle contains either 18 or 19 bits. The other four bundles are used for output data and are also either 18 or 19 bits in width. The crossbar link has a built-in link presence detect capability that effectively prevents either the CC or the crossbar from driving signals into an unpowered device on the opposite side of the link.

Remote I/O Link

The remote I/O link is a self-correcting, high-speed interface that connects between the CC and the SBA through a pair of differential cables. This differential link has one input differential data “bundle” and one output differential data “bundle,” each with a differential strobe for synchronization. The link achieves a peak data transfer rate of 1 GB/s. Embedded inside each of the cables is a differential signal pair that sends utility subsystem information through the cables from a core I/O card plugged in to the remote I/O Backplane. This utility information allows for the diagnosis of various cable interconnect problems that might be encountered during system installation, maintenance, or normal operation. The differential link has a built-in presence detect capability that effectively prevents either the CC or SBA/LBA from driving signals into an unpowered device on the opposite side of the link.

Memory Interface—Memory Multiplexer

The memory interface of the Memory Multiplexer (MM—shown in Figure 1-6 as JAB) multiplexes and demultiplexes data between the CC and the SDRAM in the memory subsystem. The data portion of the memory subsystem enters and exits the CC on four 72-bit wide Memory Interface Data (MID) buses, each bus running at 500 MT/s. The MID bus provides an independent access path to memory, with its own address bus, control bus, data bus, the MMs, and DIMMs. Only the data and TAG portions of the memory subsystem are routed through the MM devices. All address and control signals to the DIMMs are generated by the CC and are sent directly to the DIMMs by way of memory interface address and control buses. This results in lower memory latency.

Processor Dependent Hardware

The PDH uses an Intel 80C251 embedded micro controller and a USB interface chip to provide hardware resources required for both system and utility firmware. The utility subsystem employs an intelligent interface that is capable of passing multiple forms of information between system firmware and the MP by way of the PDHC.

Features provided by the PDH hardware include:

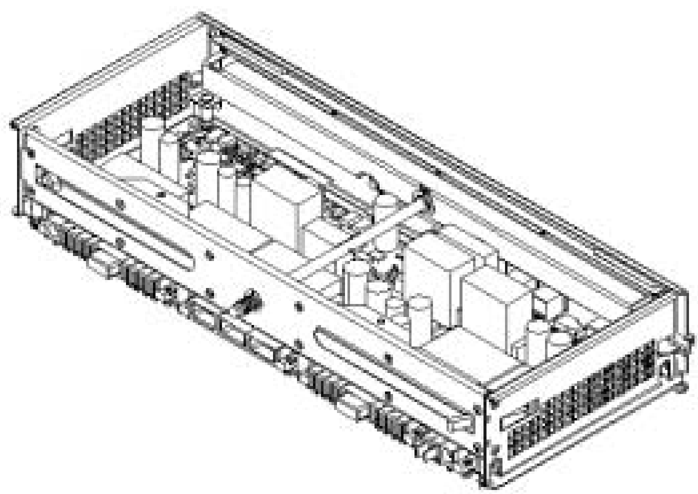
- 512 KB Flash EPROM for PDHC boot-strap code storage
- 512 KB PDHC SRAM for operational instruction and data storage
- Disposal CPLD provides memory-mapped Cars to control the cell board for multiple utility subsystem needs
- System Management Bus (Snubs) for reading of the processor EEPROM, scratch EEPROM, and thermal sensing device
- I^{2}C Bus for reading PDH, cell board, and cell power board FRU identification information
- Control and monitoring of cell board local power
- Timing control of cell board reset signals
- Logic analyzer port for accessing PDH signals
- Arbitration between the processors (system firmware) and the utility subsystem to allow the utility subsystem access to PDH peripheral components, which include:

— 12-MB FLASH EPROM for system firmware boot-strap code storage
— 1-MB system firmware scratch pad SRAM for operation instruction and data storage
— 512-KB battery backed Non-Volatile RAM (NVRAM)
— Wall-clock information provided by a battery-backed real-time clock (RTC) chip
— Marshal FPGA provides memory-mapped registers for configuration-related information
— Serial Presence Detect (SPD) bus for detection and investigation of loaded DIMMs
— Low-level debug and general purpose debug port (UART)

Cell Power Board

The Cell Power Board (OCPB) attaches to the cell board and provides redundant 12v, 3.3v, and 1.5v power for the (cell board. There is one OCPB per cell board. It contains 8 DC-DC converters, a linear regulator, input protection and filter components, in-rush current limiting circuitry, five LED indicators, and various status and control logic devices. The OCPB is not hot swappable by itself.

Figure 1-7 Cell Power Board



PCI-X I/O

The new PCI-X I/O chassis holds PCI and PCI-X type I/O cards for the two new systems. Older Superdome systems used only the PCI cards and card cages. The chassis consists of the following three printed circuit assemblies:

PCI-X I/O Backplane

PCI-X I/O Power Board

PCI-X I/O Transfer Board

It also contains the necessary mechanical components required to support 12 PCI-X card slots. The I/O system architecture is shown in Figure 1-8. This figure depicts the path between the system I/O backplane and the PCX-X card slots. The CC on each cell board communicates with the System Bus Adaptor (SBA) on the PCI-X card cage over the SBA link. The SBA link consists of both an inbound and an outbound link with an effective bandwidth of approximately 1 GB/sec. in each direction. The SBA converts the SBA link protocol into enhanced “ropes.” The SBA can support up to 16 of these high-speed bidirectional enhanced rope links for a total aggregate bandwidth of approximately 8 GB/sec. The Local Bus Adaptors (LBA) is connected to the I/O by either a single or dual enhanced ropes.

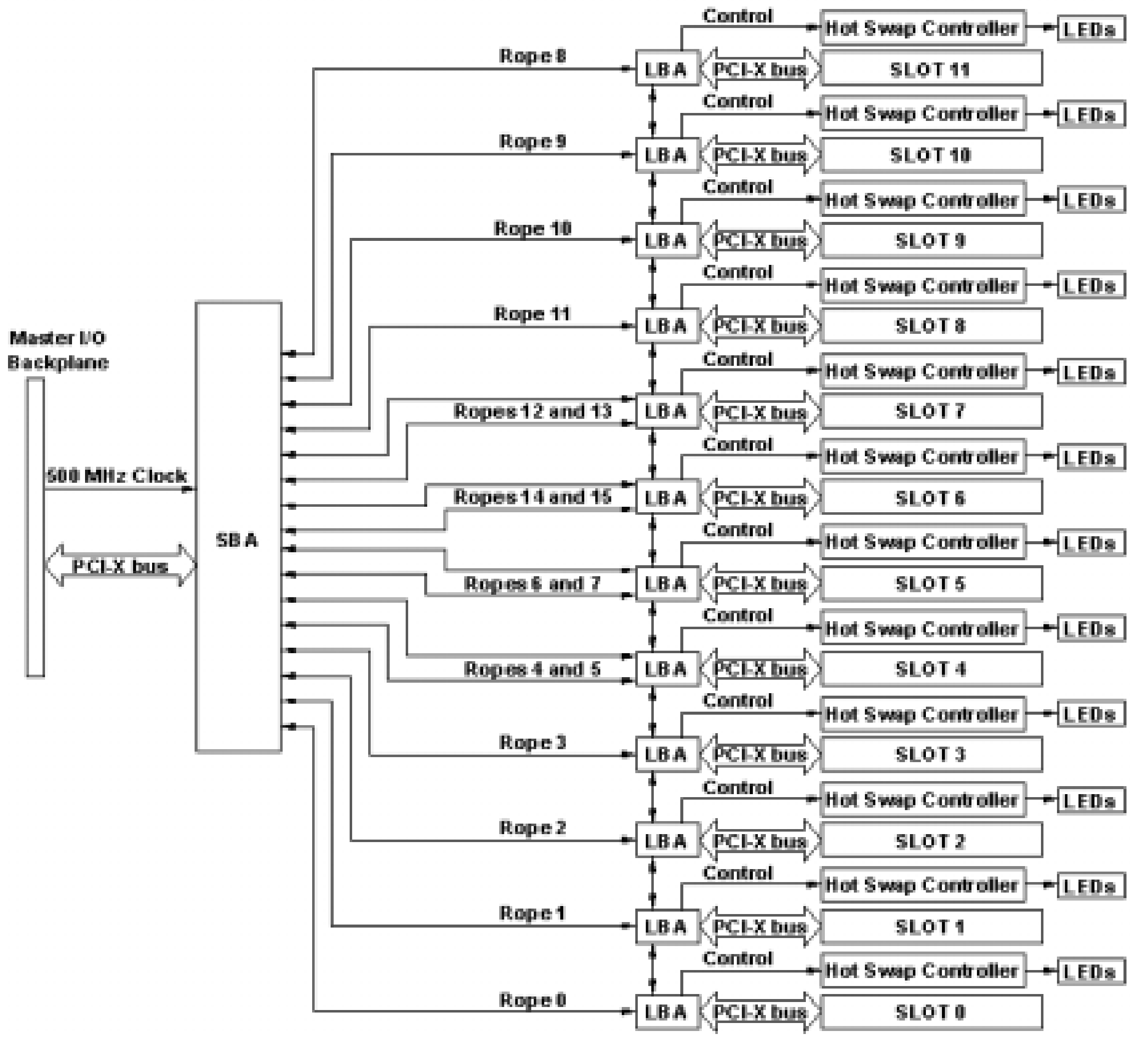
PCI-X Backplane

The heart of the PCI-X I/O card cage backplane is SBA ASIC plus 12 LBA ASICs (one per PCI-X slot). The SBA communicates directly with the CC of the host cell board by way of a high bandwidth SBA link. The SBA spawns 16 enhanced ropes that communicate with the LBA chips. Each LBA, then, produces a single 64-bit PCI-X bus, which supports a single PCI/PCI-X card.

The 16 enhanced ropes generated by the SBA are routed to the 12 LBAs chips. All PCI-X card slots can support PCI-X 133. Each slot is keyed for 3.3-volt signaling and can accept any universal or 3.3-Volt only PCI or PCI-X add-in card.

Associated with each PCI-X slot is a hot swap controller, which enables the online addition, replacement, and deletion of individual PCI-X cards without disturbing the operation of other cards in the system. The LBA provides the control/status signals and internal registers necessary for firmware to control and monitor the power status of a PCI-X slot. It also provides firmware control of the Attention indicator LED. The Slot State indicator LED is driven directly by the hot swap controller.

Figure 1-8 I/O Subsystem Architecture



PCI-X Power Board

The PCI-X power board (PCI-X PB) contains six DC-DC converters, over-voltage protection, filter components, in-rush current limiting circuitry, the local power monitor (GIOLPM) CPLD, and various status and control logic devices. It provides DC power (+1.5,+1.8V, +3.3V, +5V, +12V, -12V and +5V_HK) to the PCI-X I/O backplane boards.

The PCI-X PB mounts under the backplane board connected by the transfer board and secured by a frame to form one hot-swappable assembly. All electrical connections between the two boards are made by the transfer board.

Each power board contains one power monitor, which enables and monitors the DC power converters and reports status to the utilities subsystem. The power monitor also contains a reset delay circuit and an ID transmitter circuit for REO cable exploration.

PCI-X Transfer Board

The PCI-X I/O transfer board connects several power sources and utilities signals from the PCI-X PB to the PCI-X I/O backplane.

Core I/O

Core I/O refers to the base set of I/O functions required by every partition. The core I/O card uses a standard full-length PCI-X form factor but adds a secondary edge connector in line with its PCI-X connector. PCI-X slot 0 on the I/O backplane has been designed to accommodate the Core I/O requirements without impeding that slot’s ability to support standard PCI-X add-in cards.

Each partition must have at least one core I/O card in order to boot. Multiple core I/O cards may be present within a partition (one core I/O card is supported per I/O backplane). Only one card's partition interface, however, will be active at a time. Notice that this does not apply to the Ethernet portion of the board, which can be active on multiple boards at the same time. The MP communicates with Core I/O through a USB interface that is internal to the cabinet. The microprocessor on the Core I/O runs Partition Interface firmware.

External interfaces are provided for system 10/100BT LAN. An external port may be added to support VGA and mouse. Windows Server 2003, Datatcenter requires a Windows-based LAN card as it does not use the LAN capability provided by the standard Core I/O card.

System Backplane

There are two backplane boards: the HLSB (Left Backplane) and the HRSB (Right Backplane). For a single-cabinet system the determination is not relevant, but in a two-cabinet system it is. Whether a system has either a left or right backplane depends on the location of the system in an SD64 complex. Each backplane has a “flex” connection on one side or the other. The flex interconnect allows connecting two cabinets across a crossbar link. In order to create a two cabinet system using this flex interconnect, one cabinet must contain a HLSB and the other must contain a HRSB. The Flex goes between the two backplanes. The backplane supports eight cell boards and has four crossbar ASICs. It contains clock circuits, Local Power Monitor (LPM), link exploration logic, and various JTAG and reset logic devices. It is not hot swappable as the system power must be removed to replace a backplane.

The backplane also contains three Backplane Power Boards (HBPB) per backplane that are located on the opposite side from the cell boards. There is a maximum of three HBPBs per backplane. The HBPB supplies N+1 (N=2) redundant +1.8 V power and N+2 (N=1) redundant +3.3 V power. Each HBPB contains a DC-to-DC brick converter for each of these voltages. These converters support current sharing with the other HBPBs in the system. They are accessible from the rear of the cabinet and are hot swappable.

NOTE When hot swapping a failed HBPB, some Superdome systems upgraded to an either an hp Integrity Superdome or an hp 9000 Superdome system could lose 48V and power down the complex. If the system backplane has a engineering date code of 4310 or greater the possibility does not exist.

Front Panel Display Cell OL* LED

The Front Panel board (FPB) is located on the front skins and is accessible to the user. It contains the power ON/OFF switch, a decimal display for cabinet numbers between 0 and 15, and LED's for +5 V Power Good, +48 V Power Good, MP Present, Remote, and Attention. Each cabinet contains one Front Panel board. This assembly is not hot swappable.

The Cell OL* (HCOLB) unit is located on the front of the cabinet making its LEDs visible from the front of the cabinet. It contains 16 LEDs, two for each cell board. This assembly is not hot swappable.

Firmware

New firmware consists of many components loosely coupled by a single framework. These components are individually linked binary images that are bound together at run time. Internally, the firmware employs a software database called a device tree to represent the structure of the hardware platform and to provide a means of associating software elements with hardware functionality.

The firmware incorporates the following main interfaces:

- Processor Abstraction Layer (PAL)—Provides a seamless firmware abstraction between the processor and system software and platform firmware.
- System Abstraction Layer (SAL)—Provides a uniform firmware interface and initializes and configures the platform.
- Extensible Firmware Interface (EFI)—Provides an interface between the operating system and the platform firmware.

  It uses data tables that contain platform-related information; and boot and runtime service calls that are available to the operating system and its loader to provide a standard environment for booting.
- The Advanced Configuration and Power Interface (ACPI)—Provides a new standard environment for configuring and managing server systems.

  It moves system configuration and management from the BIOS to the operating system and abstracts the interface between the platform hardware and the operating system software, thereby allowing each to evolve independently of the other.

The firmware supports HP-UX 11i v2, Linux, and Windows through the Itanium® Processor Family standards and extensions and has no operating systems specific functionality included. All operating systems are presented the same interface to system firmware, and all features are available to the operating system. One exception to this is that Windows Server 2003, Datacenter does not support the latest ACPI specification (2.0). The firmware must provide legacy (1.0b) ACPI tables for that operating system. Using the *acpiconfig* command, the ACPI tables presented to the operating system are different.

The firmware implements the standard Itanium® Processor Family interfaces with some implementation-specific enhancements that the operating system can use but is not required to use, such as Page Deallocation Table reporting, through enhanced SAL_GET_STATE_INFO behavior.

User Interface

Itanium® Processor Family Firmware employs a user interfaces called Pre-OS System Startup Environment (POSSE). The POSSE shell is based on the EFI standard shell. Several commands have been added to the standard EFI shell to support Hewlett-Packard value-added functionality. The new commands encompass functionality similar to BCH commands on PA-RISC machines. However, the POSSE shell is not designed to encompass all BCH functionality. They are separate and distinct interfaces. Please see the POSSE specifications for further details.

Event IDs for Errors and Events

The new system firmware generates event IDs, similar to chassis codes, for errors, events, and forward progress to the MP through common shared memory. The MP interprets, stores, and reflects these event IDs back to running partitions. This helps in the troubleshooting process.

2 Installing the System

This chapter describes installation of a new hp Integrity Superdome or hp 9000 Superdome systems. It is assumed that the installer has received adequate training and is knowledgeable with the product and has a good, overall background in electronics and customer hardware installation.

Introduction

The instructions in this guide are written for Customer Engineers (CEs) who are experienced at installing complex systems.

If installing an hp Integrity Superdome or hp 9000 Superdome for the first time, read this manual. It provides details about each step in the installation process. Some steps must be performed before others can be completed successfully. To avoid having to undo and redo an installation step, follow the installation sequence outlined in this guide.

Communications Interference

HP system compliance tests are conducted with HP supported peripheral devices and shielded cables, such as those received with the system. The system meets interference requirements of all countries in which it is sold. These requirements provide reasonable protection against interference with radio and television communications.

Installing and using the system in strict accordance with instructions provided by HP minimizes the chances that the system will cause radio or television interference. However, HP does not guarantee that the system will not interfere with radio and television reception.

Take these precautions:

- Use only shielded cables.
- Install and route the cables per the instructions provided.
- Ensure that all cable connector screws are firmly tightened.
- Use only HP supported peripheral devices.
- Ensure that all panels and cover plates are in place and secure before system operation.

Electrostatic Discharge

HP systems and peripherals contain assemblies and components that are sensitive to electrostatic discharge (ESD). Carefully observe the precautions and recommended procedures in this manual to prevent component damage from static electricity.

Take these precautions:

- Always wear a grounded wrist strap when working on or around system components.
- Treat all assemblies, components, and interface connections as static-sensitive.
- When unpacking cards, interfaces, and other accessories that are packaged separately from the system, keep the accessories in their conductive plastic bags until they are ready to be installed.
- Before removing or replacing any components or installing any accessories in the system, select a work area where potential static sources are minimized, preferably an anti-static work station.
- Avoid working in carpeted areas, and keep body movement to a minimum while installing accessories.

Unpacking and Inspecting

This section describes what to do before unpacking the server and how to unpack the system itself.

WARNING **Do not attempt to move the cabinet, either packed or unpacked, up or down an incline of more than 15°**.

Verifying Site Preparation

Verifying site preparation includes two tasks: gathering LAN information and verifying electrical requirements.

Gathering LAN Information

The SMS connects to the customer's LAN. Determine the IP of the appropriate address.

Verifying Electrical Requirements

The site should have been verified for proper grounding and electrical requirements prior to the system being shipped to the customer as part of the site preparation. Before unpacking and installing the system, verify with the customer that grounding specifications and power requirements have been met.

Checking the Inventory

The sales order packing slip lists all equipment shipped from HP. Use this packing slip to verify that all equipment has arrived at the customer site.

NOTE To identify each item by part number, refer to the sales order packing slip.

One of the large overpack containers is labeled "Open Me First." This box contains the Solution Information Manual and DDCAs. The unpacking instructions are in the plastic bag taped to the cabinet.

The following items are in other containers and should be checked against the packing list:

- Power Distribution Control Assembly (PDCA) and power cord
- Two blower housings per cabinet
- Four blowers per cabinet
- Four side skins with related attachment hardware
- Cabinet blower bezels and front door assemblies
- Support Management Station
- Cables
- Optional equipment
- Boot device with HP-UX, Windows, and/or Linux installed.

Inspecting the Shipping Containers for Damage

HP shipping containers are designed to protect their contents under normal shipping conditions. After the equipment arrives at the customer site, carefully inspect each carton for signs of shipping damage.

WARNING **Do not attempt to move the cabinet, either packed or unpacked, up or down an incline of more than 15^{o}.**

A tilt indicator is installed on the back and side of the cabinet shipping container. If the container has been tilted to an angle that could cause equipment damage, the beads in the indicator shift positions. If a carton has received a physical shock and the tilt indicator is in an abnormal condition, visually inspect the unit for any signs of damage. If damage is found, document the damage with photographs, and contact the transport carrier immediately.

Figure 2-1 Tilt Indicator (Normal)

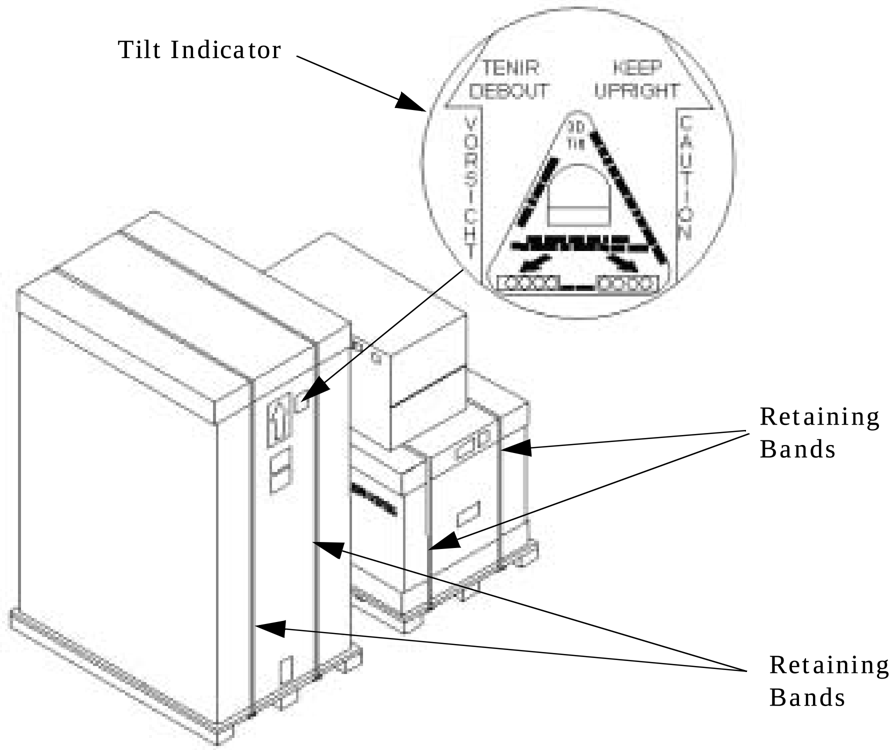
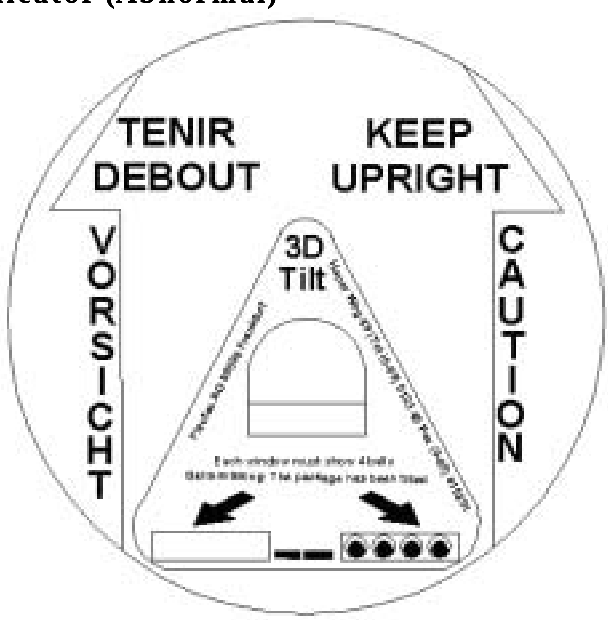


Figure 2-2 Tilt Indicator (Abnormal)



NOTE If the tilt indicator shows that an abnormal shipping condition has occurred, write “possible hidden damage” on the bill of lading, and keep the packaging.

Inspection Precautions

- When the shipment arrives, check each container against the carrier's bill of lading. Inspect the exterior of each container immediately for mishandling or damage during transit. If any of the containers are damaged, request the carrier's agent be present when the container is opened.
- When unpacking the container(s), inspect each item for external damage. Look for broken controls and connectors, dented corners, scratches, bent panels, and loose components.

NOTE Hewlett-Packard recommends keeping the shipping container or the packaging material. If it becomes necessary to repackage the cabinet, the original packing material will be needed.

If discarding the shipping container or packaging material, please dispose of them in an environmentally responsible manner (recycle, if possible).

Claims Procedures

If the shipment is incomplete, the equipment is damaged, or it fails to meet specifications, notify the nearest Hewlett-Packard Sales and Service Office. If damage occurred in transit, notify the carrier as well.

Hewlett-Packard will arrange for replacement or repair without waiting for settlement of claims against the carrier. In the event of damage in transit, retain the packing container and packaging materials for inspection.

Unpacking and Inspecting Hardware Components

Tools Required

The following tools are required to install the system:

- Standard hand tools (such as a adjustable-end wrench)
- ESD grounding strap
- Digital Ohm-Voltmeter (or VOM) capable of reading AC/DC voltages
- 1/2-inch wrench/socket
- 9/16-inch wrench
- #2 Phillips screwdriver
- Flathead screwdriver
- Wire cutters or utility knife
- Safety goggles or glasses
- T10, T15, T20, T25, and T30 Torx drivers
- 9-pin to 25-pin serial cable (Hewlett-Packard Part Number 24542G)
- 9-pin to 9-pin Null modem cable (Hewlett-Packard Part Number F1047-80002)

Unpacking the Cabinet

CAUTION Use three people to unpack the cabinet safely.

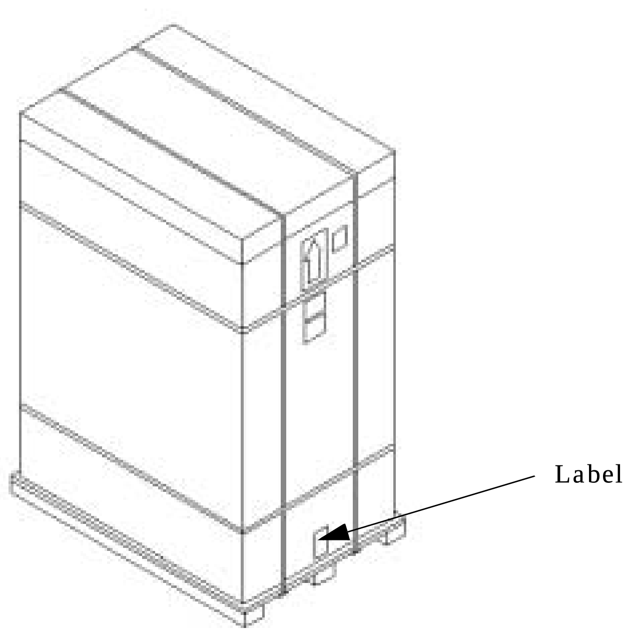
Hewlett-Packard recommends removing the cardboard shipping container before moving the cabinet into the computer room.

NOTE If unpacking the cabinet in the computer room, be sure to position it so that it can be moved into its final position easily. Notice that the front of the cabinet is the side with the label showing how to align the ramps.

To unpack the cabinet, perform the following steps:

Step 1. Position the packaged cabinet so that a clear area about three times the length of the package (**about 12 feet**) is available in front of the unit, and at least 2 feet are available on the sides.

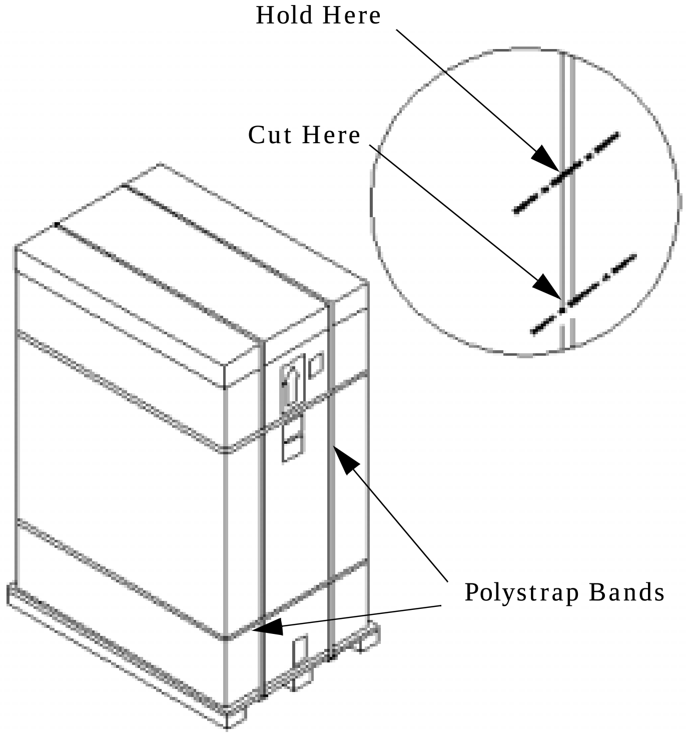
Figure 2-3Front of Cabinet Container



Step 2. Cut the plastic Polystraps bands around the shipping container.

WARNING **Do not stand directly in front of the strapping while cutting it. Hold the band above the intended cut and wear protective glasses. These bands are under tension. When cut, they spring back and could cause serious eye injury.**

Figure 2-4Cutting Polystrap Bands



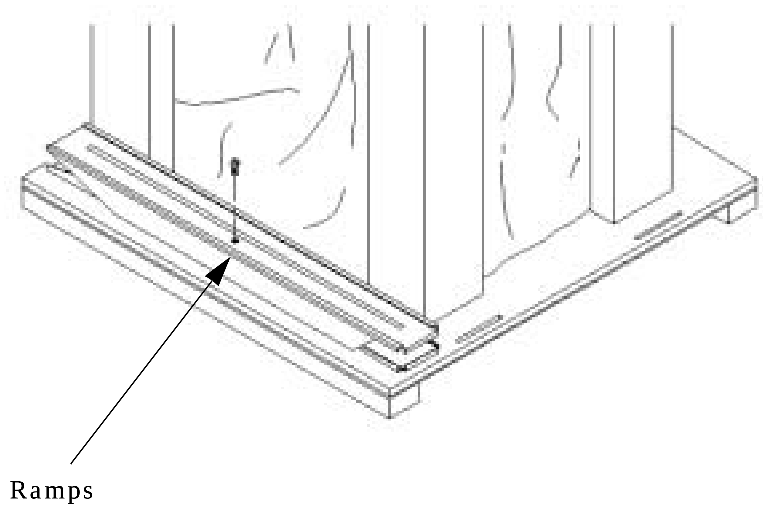
Step 3. Lift the cardboard corrugated top cap off of the shipping box.

Step 4. Remove the corrugated sleeves surrounding the cabinet.

Step 5. Remove the stretch wrap, the front and rear top foam inserts, and the four corner inserts from the cabinet.

Step 6. Remove the ramps from the pallet and set them aside.

Figure 2-5Removing the Ramps from the Pallet



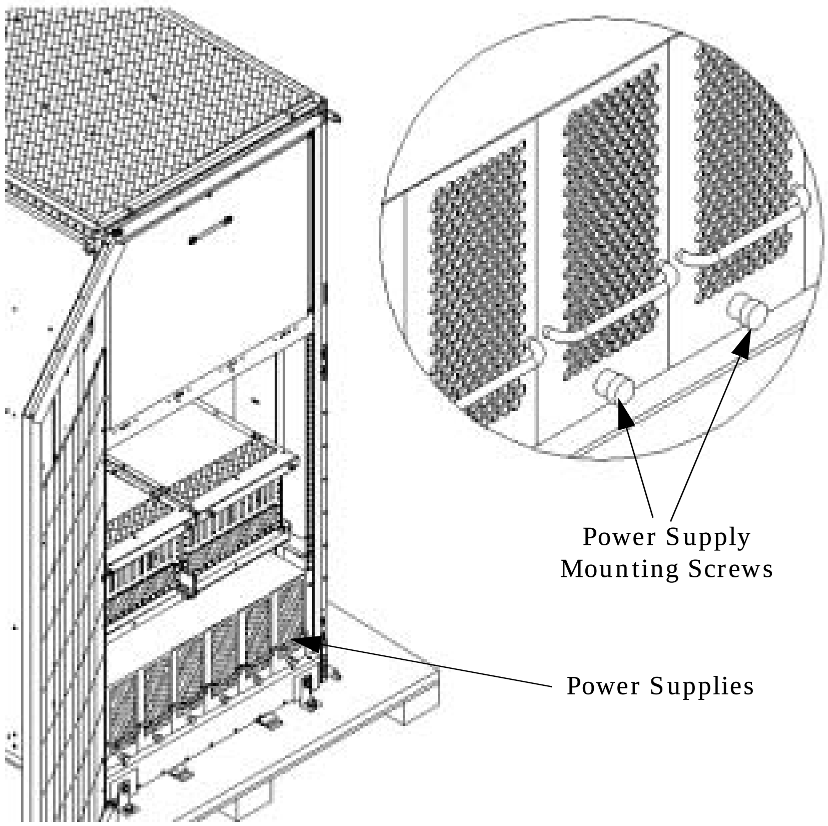
Step 7. Remove the plastic anti-static bag by lifting it straight up off the cabinet, and check for damage. If damaged, follow the claims procedure. Some damage can be repaired by replacing the damaged part. If extensive damage is found, it may be necessary to repack and return the entire cabinet to Hewlett-Packard.

Check the cabinet exterior for signs of shipping damage.

Step 1. Look at the top and sides for dents, warpage, or scratches.

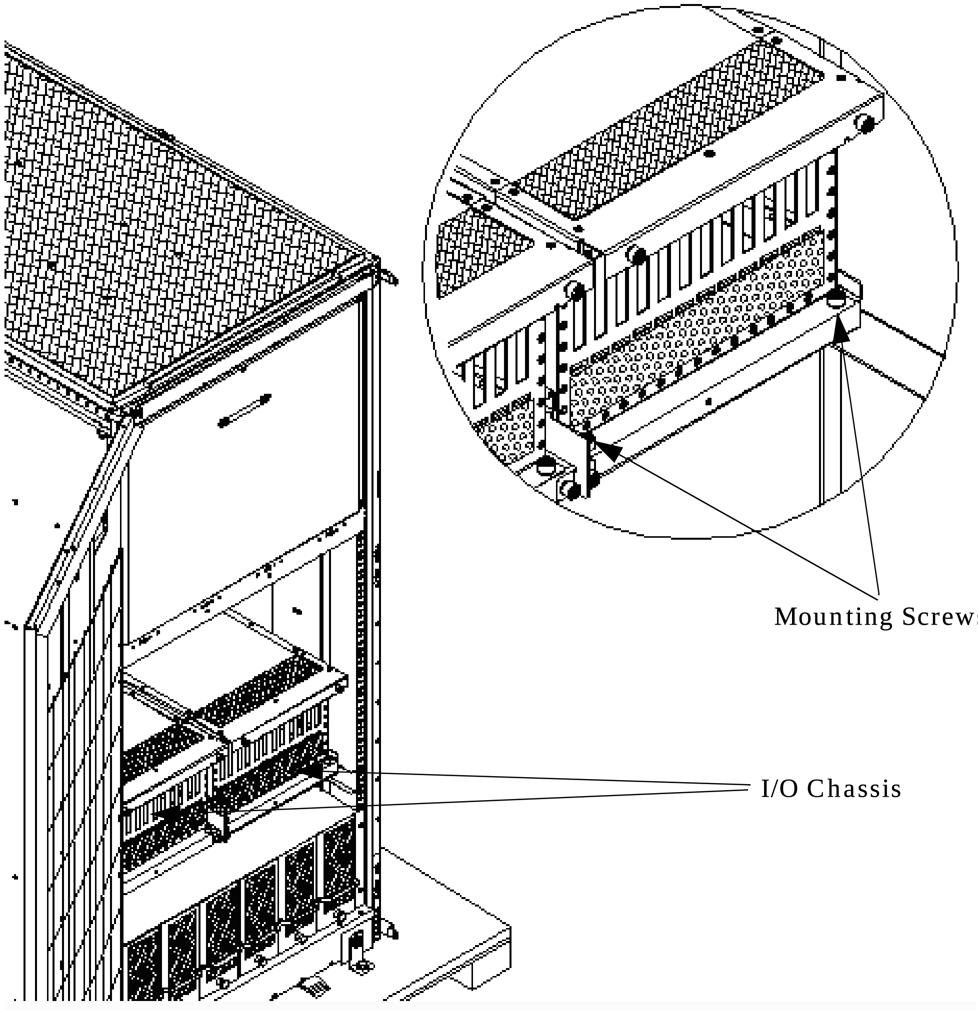
Step 2. Check that the power supply mounting screws are in place and **locked**.

Figure 2-6Check Power Supply Mounting Screws



Step 3. Check to see that the I/O chassis mounting screws are in place and secure.

Figure 2-7I/O Chassis Mounting Screws

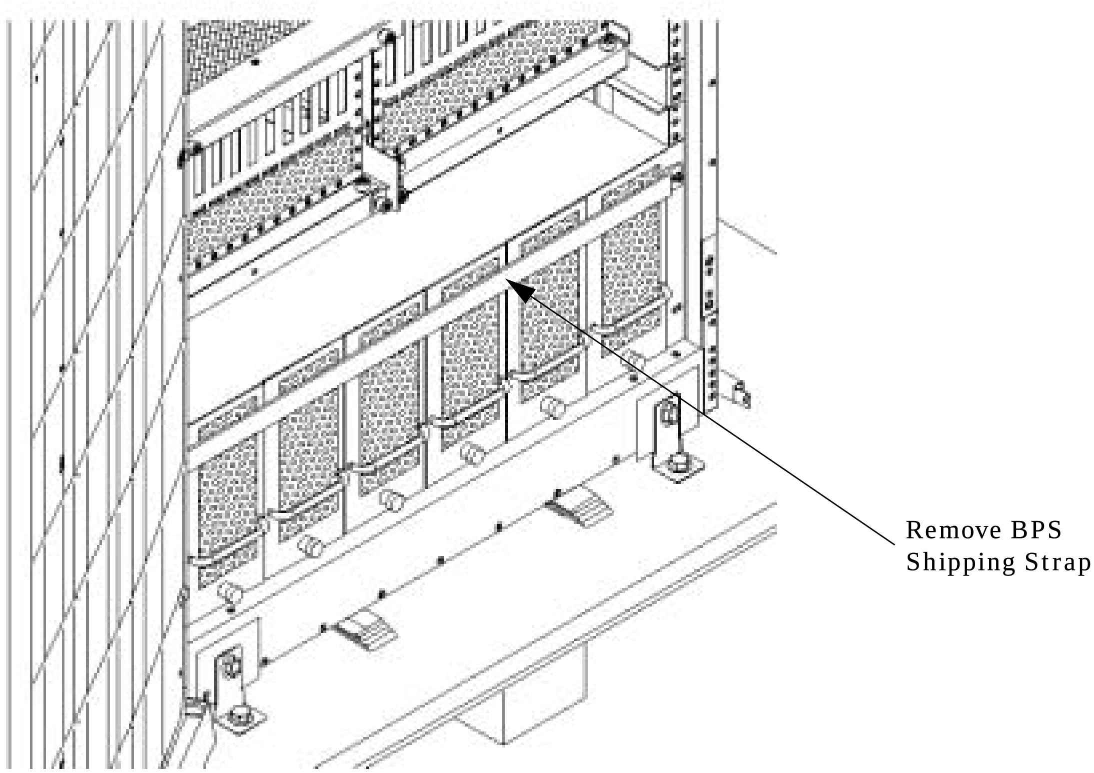


I/O chassis

Check all components for signs of shifting during shipment or any signs of damage.

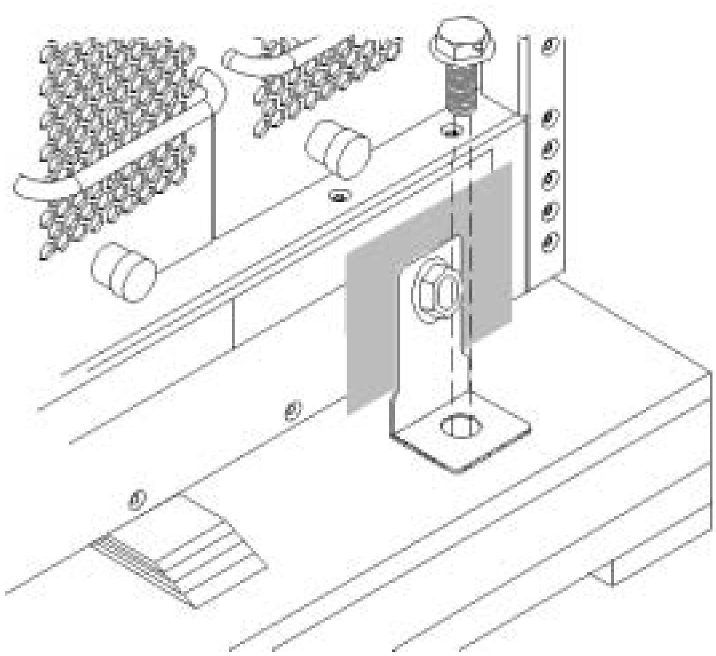
Step 4. Remove the shipping strap that holds the BPSs in place during shipping.

Figure 2-8Remove BPS Shipping Strap



Step 5. Remove the pallet mounting brackets and pads on the side of the pallet where the ramp slots are located.

Figure 2-9Removing the Mounting Brackets



Step 6. On the other side of the pallet, remove only the bolt on each mounting bracket that is attached to the cabinet.

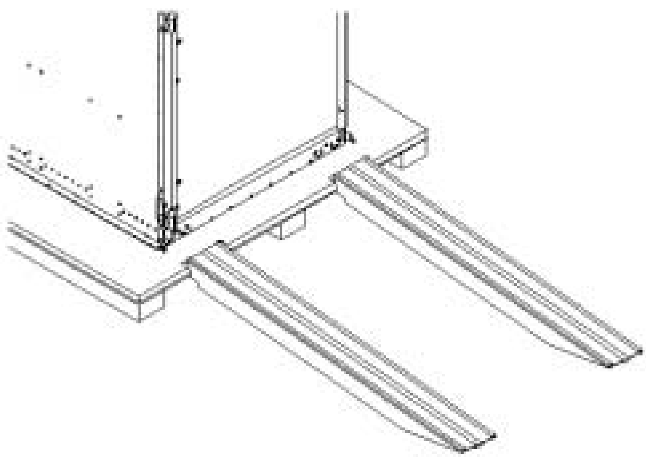
WARNING **Do not remove the bolts on the mounting brackets that attach to the pallet. These bolts prevent the cabinet from rolling off the back of the pallet.**

Step 7. Insert the ramps into the slots on the pallet.

CAUTION Make sure the ramps are **parallel and aligned**.

The casters on the cabinet should roll unobstructed onto the ramp.

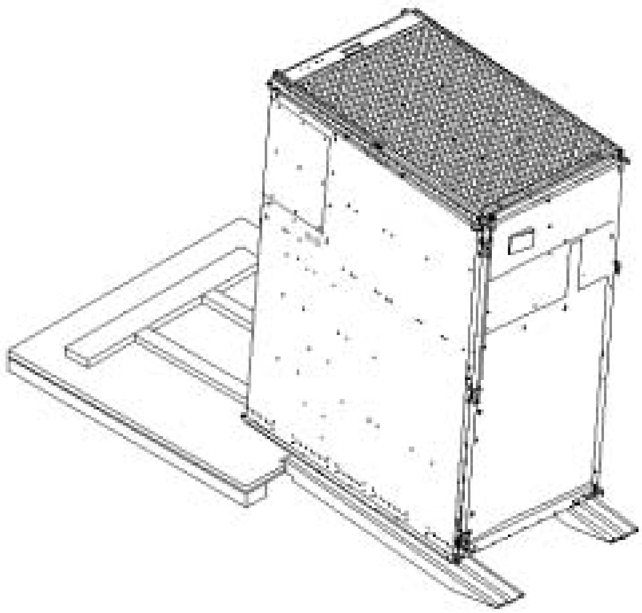
Figure 2-10 Positioning the Ramps



WARNING **Do not attempt to roll a cabinet without help. The cabinet can weigh as much as 1400 lbs. Three people are required to roll the cabinet off the pallet. Position one person at the rear of the cabinet and one person on each side.**

Step 8. Carefully roll the cabinet down the ramp.

Figure 2-11Rolling the cabinet Down the Ramp



WARNING **Do not attempt to move the cabinet, either packed or unpacked, up or down an incline of more than 15^{o}.**

Step 9. Unpack any other cabinet(s) that was shipped.

Unpacking the PDCA

At least one Power Distribution Control Assembly (PDCA) is shipped with the system. In some cases, the customer may have ordered two PDCAs, the second to be used as a backup power source. Unpack the PDCA now and ensure it has the power cord option for this installation.

There are several power cord options available for the PDCAs. Only options 6 and 7 are currently available in new system configurations.

Table 2-2 details options 6 and 7.

Table 2-1 Available Power Options

Option	Source Type	Source Voltage (nominal)	PDCA Required	Input Current Per Phase 200-240 VAC [a]	Power Receptacle Required
6	3-phase	Voltage range 200-240 VAC, phase-to-phase, 50/60 Hz	four-wire	44A Maximum per phase	Connector and plug provided with a 2.5-meter power cable. Electrician must hard-wire receptacle to 60A site power.b,d
7	3-phase	Voltage range 200-240 VAC, phase-to-neutral, 50/60 Hz	five-wire	24A Maximum per phase	Connector and plug provided with a 2.5-meter power cable. Electrician must hard-wire receptacle to 32A site power.b,d

a. A dedicated branch circuit is required for each PDCA installed.

Table 2-2 Option 6 and 7 Specifics

PDCA Part Number	Attached Power Cord	Attached Plug	Receptacle Required
A5201-69023 (Option 6)	OLFLEX 190 (PN 600804) is a 2.5 meter multi conductor, 600 volt, 90 degree C, UL and CSA approved, oil resistant flexible cable. (8 AWG 60 A capacity)	Mennekes ME 460P9 (60 A capacity)	Mennekes ME 460R9 (60 A capacity)
A5201-69024 (Option 7)	H07RN-F (OLFLEX PN 1600130) is a 2.5 meter heavy duty neoprene jacketed harmonized European flexible cable. (4 mm^2 32A capacity)	Mennekes ME 532P6-14 (32A capacity)	Mennekes ME 532R6-1500 (32 A capacity)

Returning Equipment

If the equipment is found to be damaged, use the original packing material to repackage the cabinet for shipment. If the packing material is not available, contact the local Hewlett-Packard Sales and Support Office regarding shipment.

Before shipping, place a tag on the container (or equipment) to identify the owner and the service to be performed. Include the equipment model number and the full serial number, if applicable. The model number and the full serial number are printed on the System Information Labels located at the bottom front of the cabinet.

WARNING **Do not attempt to push the loaded cabinet up the ramp onto the pallet. Three people are required to push the cabinet up the ramp and position it on the pallet. Check the condition of the loading/unloading ramp before use.**

Repackaging:

Step 1. Assemble the Hewlett-Packard packing materials that came with the cabinet.

Step 2. Carefully roll the cabinet up the ramp.

Step 3. Attach the pallet mounting brackets to the pallet and the cabinet.

Step 4. Reattach the ramps to the pallet.

Step 5. Replace the plastic anti-static bag and foam inserts.

Step 6. Replace the cardboard surrounding the cabinet.

Step 7. Replace the cardboard caps.

Step 8. Secure the assembly to the pallet with straps.

The cabinet is now ready for shipment.

Setting Up the hp Integrity Superdome or hp 9000 Superdome

After a site has been prepared, the system has been unpacked, and components have been inspected, the system can now be prepared for booting.

Moving the System and Related Equipment to the Installation Site

Carefully move the cabinet(s) and its related equipment to the installation site but not into its final location. If the system is to be placed at the end of a row, side bezels must be added before positioning the cabinet in its final location. Check the path from where the system was unpacked to its final destination to make sure the way is clear and free of obstructions. If the cabinet must be moved up ramps, be sure to maneuver it using three people.

Unpacking and Installing the Blower Housings and Blowers

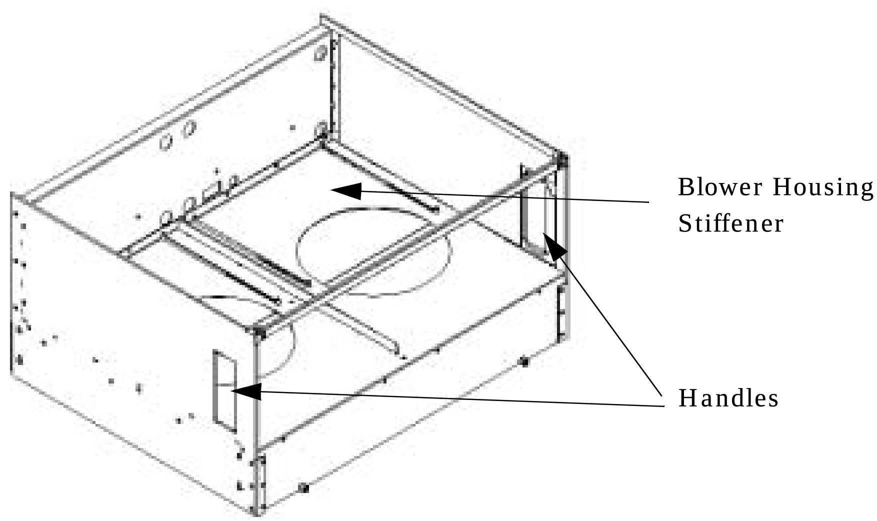
There are two blower housings and four blowers for each cabinet. Although similar in size, the blower housings for each cabinet are not the same; one has a connector to which the other attaches. Use the following procedure to unpack and install the housings and blowers:

Step 1. Unpack the housings from the cardboard box and set them aside.

The rear housing is labeled **Blower 3 Blower 2**. The front housing is labeled **Blower 0 Blower 1**.

CAUTION Do not lift the housing by the stiffener.

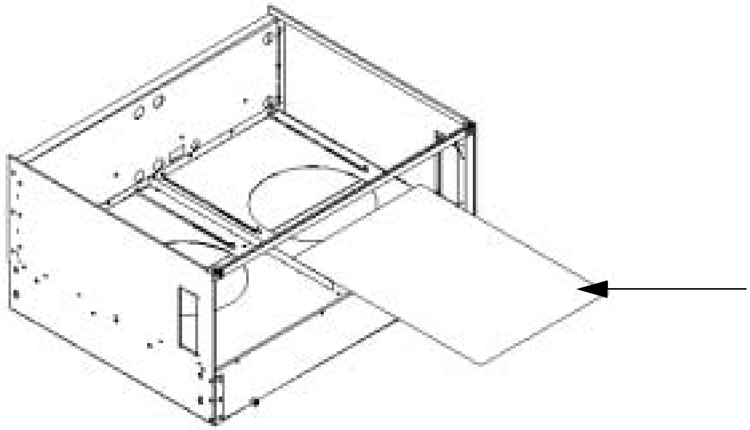
Figure 2-12Blower Housing Stiffener



Step 2. Remove the cardboard from the blower housing.

This cardboard protects the housing baffle during shipping. If it is not removed, the fans will not work properly.

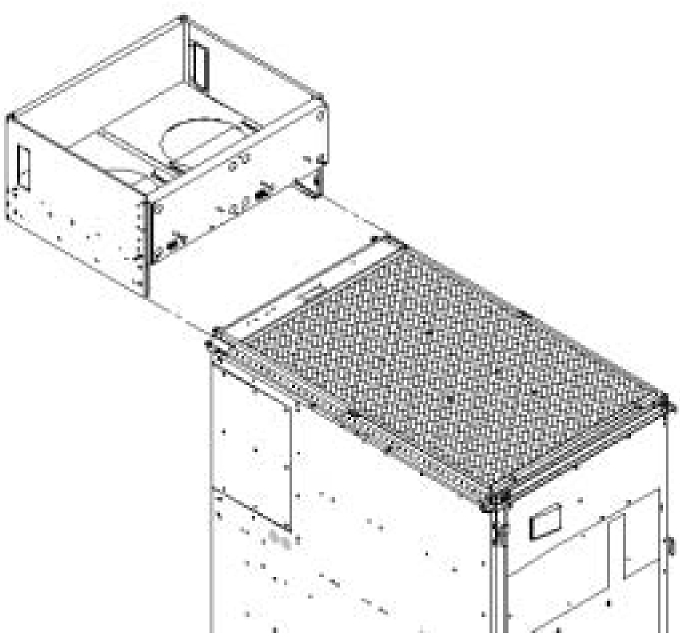
Figure 2-13Removing Protective Cardboard from the Housing



NOTE Double-check that the protective cardboard has been removed.

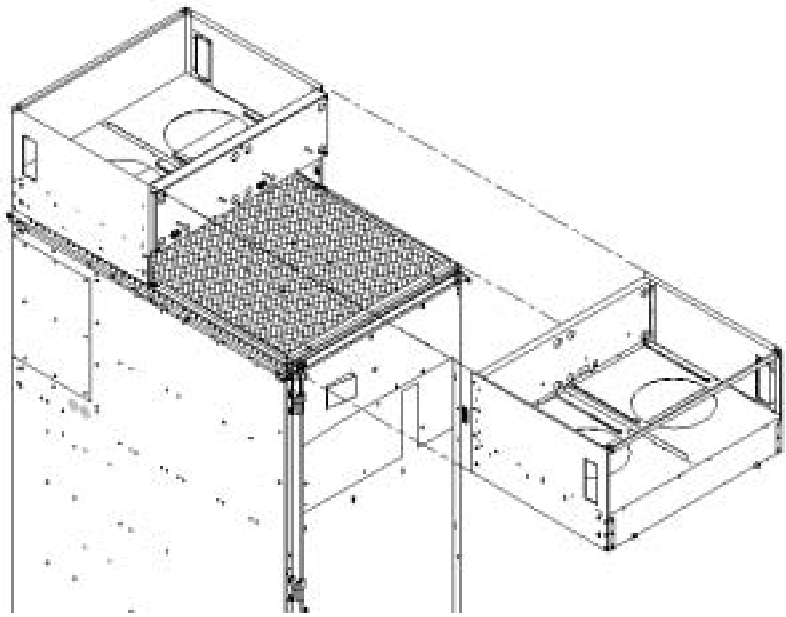
Step 3. Using the handles on the housing labeled **Blower 3 Blower 2**, part number A5201-62029, align the edge of the housing over the edge at the top rear of the cabinet, slide it into place, and tighten the thumbscrews at the front of the housing.

Figure 2-14Installing the Rear Blower Housing



Step 4. Using the handles on the housing labeled **Blower 0 Blower 1**, part number A5201-62030, align the edge of the housing over the edge at the top front of the cabinet, and slide it into place until the connectors at the back of each housing are fully mated; then tighten the thumbscrews at the front of the housing.

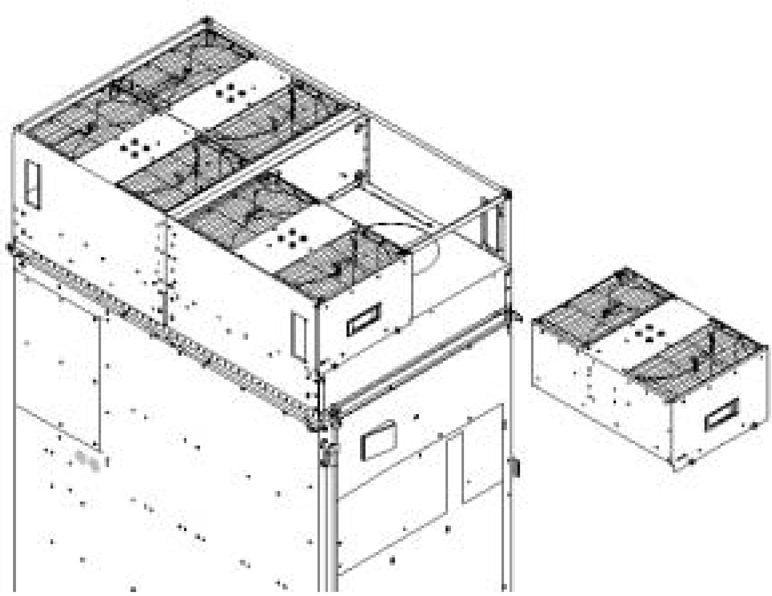
Figure 2-15Installing the Front Blower Housing



Step 5. Unpack each of the four blowers.

Step 6. Insert each of the four blowers into place in the blower housings with the thumbscrews at the bottom.

Figure 2-16Installing the Blowers



Step 7. Tighten the thumbscrews at the front of each blower.

Step 8. If required, install housings on any other cabinets that were shipped with the system.

Attaching Side Skins and Blower Side Bezels

There are two cosmetic side panels that affix to the left and right sides of the system. In addition, there are bezels that cover the sides of the blowers.

IMPORTANT Be sure to attach the side skins at this time in the installation sequence, especially if the cabinet is to be positioned at the end of a row of cabinets or between cabinets.

Attaching the Side Skins

There are four side skins: two front-side skins and two rear-side skins.

NOTE Attach side skins to the left side of Cabinet 0 and the right side of Cabinet 1 (if applicable).

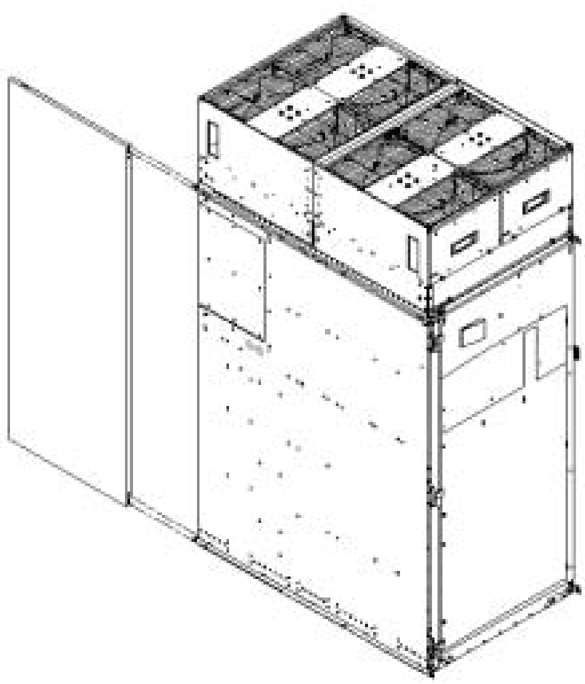
To attach the side skins:

Step 1. If not already done, remove the side skins from their boxes and protective coverings.

Step 2. From the end of the brackets at the back of the cabinet, position the side skin *with the lap joint* (rear) over the top bracket and under the bottom bracket, and gently slide it into position.

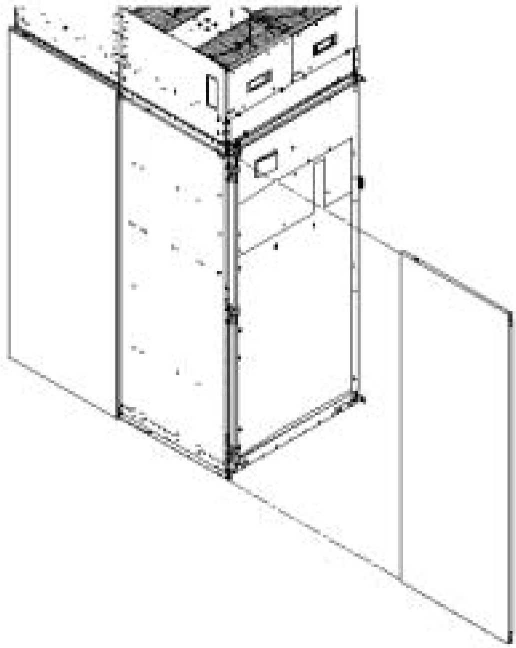
Two skins are installed on each side of the cabinet, one has a lap joint (rear) and one does not (front). The side skins with the lap joint is marked *Rear* and the side skins without the lap joint is marked *Front.*

Figure 2-17Attaching the Rear Side Skin



Step 3. Attach the skin *without the lap joint* (front) over the top bracket and under the bottom bracket and gently slide the skin into position.

Figure 2-18 Attaching the Front Side Skins



Step 4. Push the side skins together, making sure the skins overlap at the lap joint.

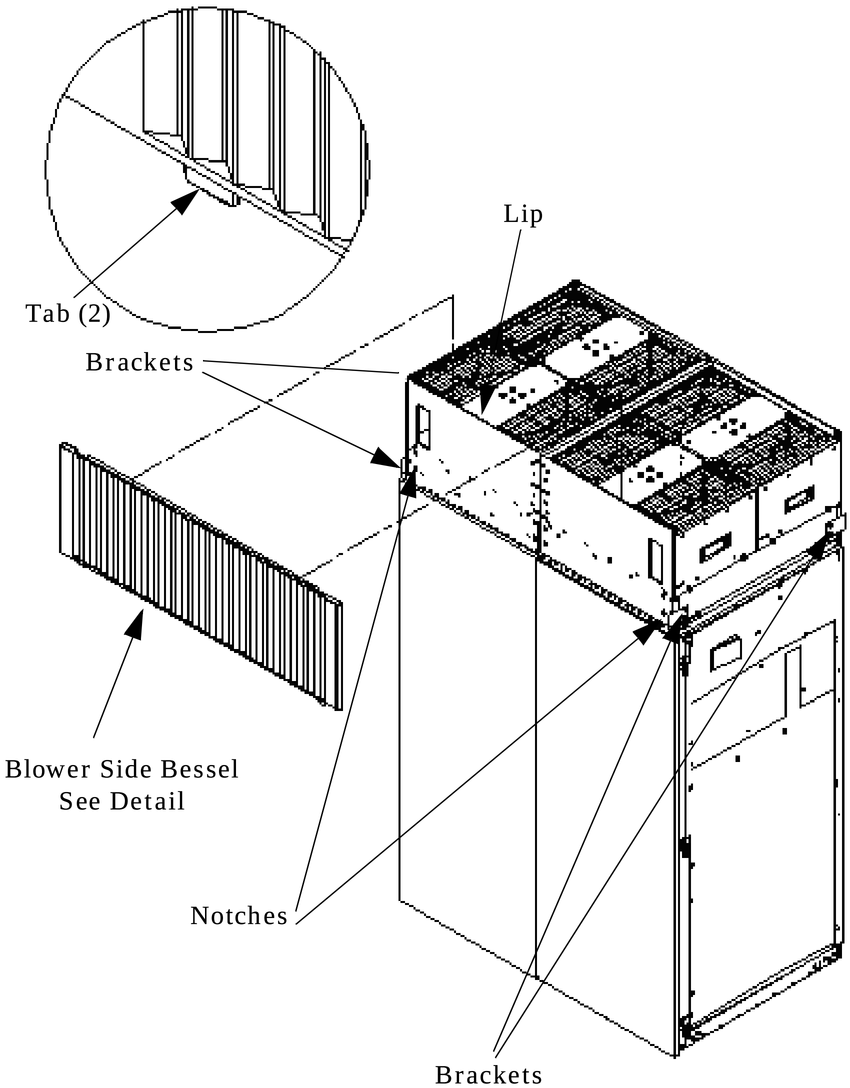
Attaching the Blower Side Bezels

The bezels are held on at the top by the bezel lip, which fits over the top of the blower housing frame, and is secured at the bottom by tabs that fit into slots on the cabinet side panels.

The right and left blower side bezels are attached using the same procedure.

Step 1. Place the side bezel slightly above the blower housing frame.

Figure 2-19 Attaching the Side Bezels and Blower Bracket Locks



Step 2. Align the lower bezel tabs to the slots in the side panels.

Step 3. Lower the bezel so the bezel top lip fits securely on the blower housing frame and the two lower tabs are fully inserted into the side panel slots.

Step 4. Using a Torx 10 drive, attach the screws (Hewlett-Packard P/N 0515-4271) to secure the skins to the brackets.

NOTE Use four screws to attach the side skins to the top and bottom brackets, except for the top bracket on the right side (facing the front of the cabinet). Do not attach the rear screw on that bracket. Insert all screws but do not tighten until all side skins are aligned.

Step 5. Repeat Step 1 through Step 4 for the skins on the other side of the cabinet.

Step 6. To secure the side bezels to the side skins, attach the blower bracket locks (Hewlett-Packard P/N A5201-00268) to the front and back blowers using a T20 Torx driver.

There are two blower bracket locks on the front blowers and two on the rear. Refer to Figure 2-19.

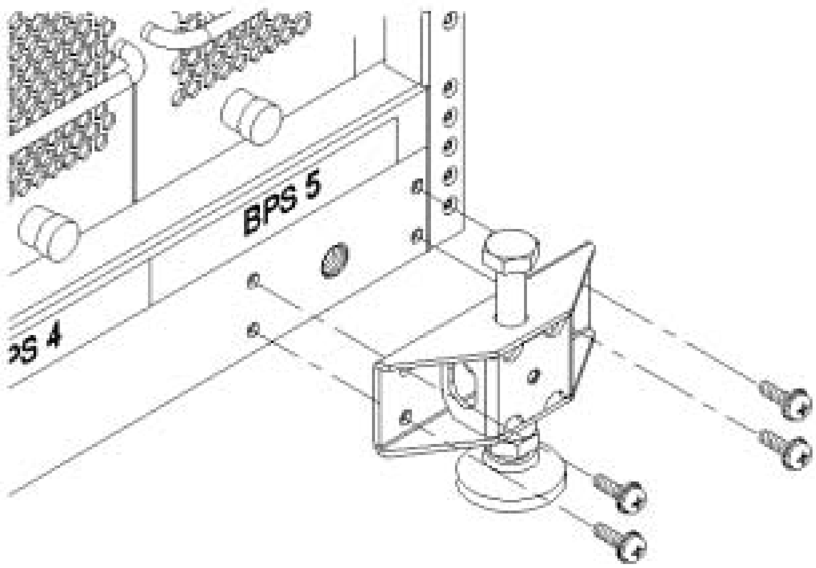
Attaching the Leveling Feet and Leveling the cabinet

After positioning the cabinet to its final position, attach and adjust the leveling feet using the following procedure:

Step 1. Remove the leveling feet from their packages.

Step 2. Attach the leveling feet to the cabinet using four (T25 Torx) screws.

Figure 2-20Attaching the Leveling Feet



Step 3. Screw down each leveling foot clockwise, until it is in firm contact with the floor. Adjust each foot until the cabinet is level.

Installing the Front Door Bezels and the Front and Back Blower Bezels

There are two doors: one at the front and one at the back. The back door is shipped on the chassis and requires no assembly. The front door, which is also shipped on the chassis, requires the assembly of two plastic bezels to its front surface and a cable from the door to the upper front bezel. In addition, there are bezels that fit over the blowers at the front and back of the cabinet.

Installing the Front Door Bezels

The front door assembly includes two cosmetic covers, a control panel, and a key lock. Installing the front door is a three-step process: connecting the control panel ribbon cable from the chassis to the control panel, and mounting the two plastic bezels onto the metal chassis door.

NOTE The procedure in this section requires two people and must be performed with the front metal chassis door open.

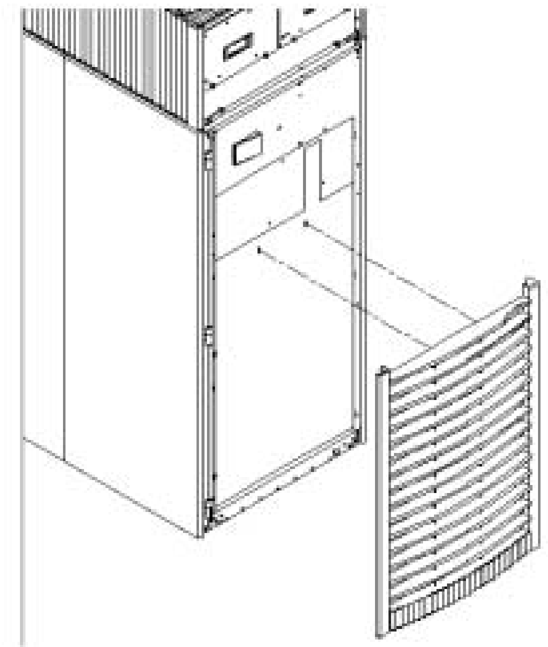
To install the front door assembly:

Step 1. Open the door, unsnap the screen, and remove all the filters held in place with Velcro.

Step 2. Remove the cabinet keys that are taped inside the top front door bezel.

Step 3. Insert the shoulder studs on the lower door bezel into the holes on the front door metal chassis.

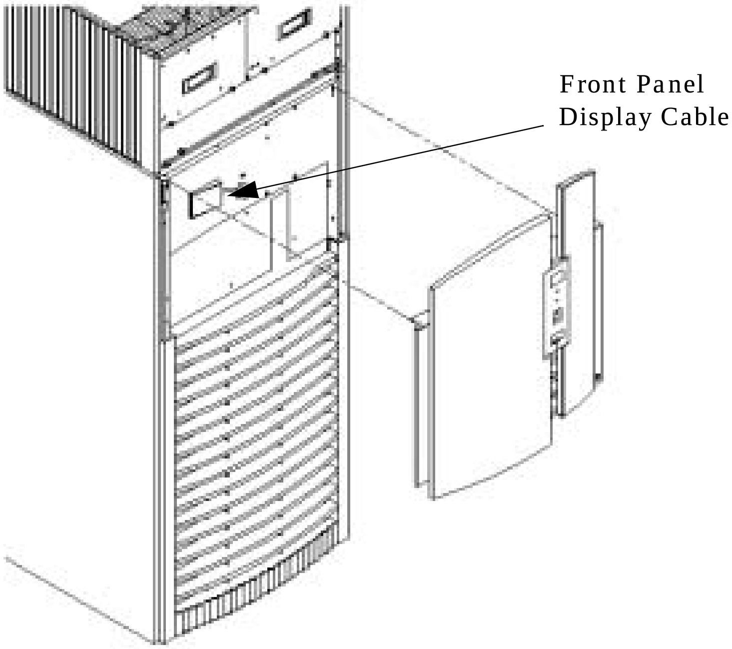
Figure 2-21Installing the Lower Front Door Assembly



Step 4. Using a Torx 10 driver, secure the lower door bezel to the front door chassis with 10 of the screws provided (Hewlett-Packard P/N 0515-0372). Insert all screws loosely, then torque them after the bezel is aligned.

Step 5. While one person holds the upper door bezel near the door chassis, attach the ribbon cable to the back of the control panel on the bezel and tighten the two flathead screws.

Figure 2-22 Installing the Upper Front Door Assembly



Step 6. Feed the grounding strap through the door and attach it to the cabinet.

Step 7. Insert the shoulder studs on the upper door bezel into the holes on the front door metal chassis.

Step 8. Using a Torx 10 driver, secure the upper door bezel to the metal door with eight of the screws provided, part number 0515-0372. Be sure to hold down on the hinge side of the bezel while tightening the screws to prevent misalignment of the bezel.

Step 9. Reattach all filters removed in Step 1.

Installing the Rear Blower Bezel

The rear blower bezel is a cosmetic cover for the blowers and is located above the rear door.

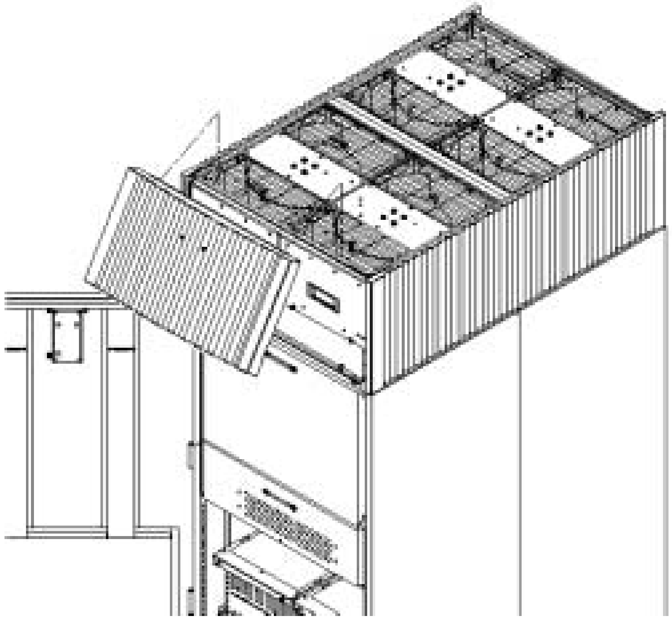
To install the rear blower bezel:

Step 1. Open the rear cabinet door.

The latch is located on the right side of the door.

Step 2. Slide the bezel over the blower housing frame, hooking the lip of the bezel onto the cross support of the blower housing, hold the bottom of the bezel. Rotate the bezel from the top a until the bottom snaps in place.

Figure 2-23Installing the Rear Blower Bezel



Step 3. Align the bezel over the nuts that are attached to the bracket at the rear of the cabinet.

Step 4. Using a T20 Torx driver, tighten the two captive screws on the lower flange of the bezel.

NOTE Tighten the screws securely, otherwise the screw may interfere with the door.

Step 5. Close the cabinet rear door.

Installing the Front Blower Bezel

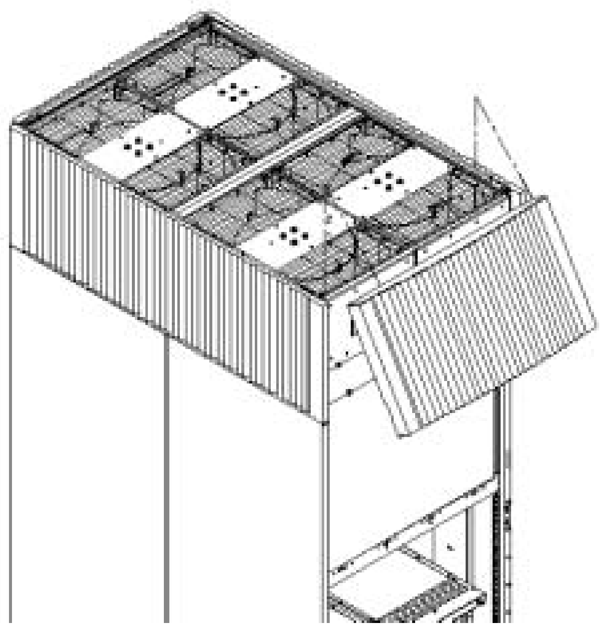
The front blower bezel is a cosmetic cover for the blowers and is located above the front door. To install it, use the following procedure:

Step 1. Open the front door.

The latch is located on the right side of the front door.

Step 2. Position the bezel over the blower housing frame, hooking the lip of the bezel onto the cross support of the blower housing.

Figure 2-24Installing the Front Blower Bezel



Step 3. Align the bezel over the nuts that are attached to the bracket at the front of the cabinet.

Step 4. Using a T20 Torx driver, tighten the two captive screws on the lower flange of the bezel.

NOTE Tighten the screws securely, otherwise the screw may interfere with the door.

Step 5. Close the front door.

Installing and Verifying the PDCA

All systems are delivered with the appropriate cable plug for Options 6 and 7.

Check the voltages at the receptacle prior to plugging in the PDCA plug. Refer to Figure 2-26 and Figure 2-27 for pin locations.

- To verify the proper wiring for a four-wire PDCA, use a DVM to measure the voltage at the receptacle. Voltage should read 200 - 240 Vac phase-to-phase as measured between the receptacle pins as follows: L1 to L2, L2 to L3, L1 to L3.
- To verify the proper wiring for a five-wire PDCA, use a DVM to measure the voltage at the receptacle. Voltage should read 200 - 240 Vac phase-to-neutral as measured between the receptacle pins as follows: L1 to N, L2 to N, L3 to N.

Figure 2-25 PDCA Assembly for Options 6 and 7

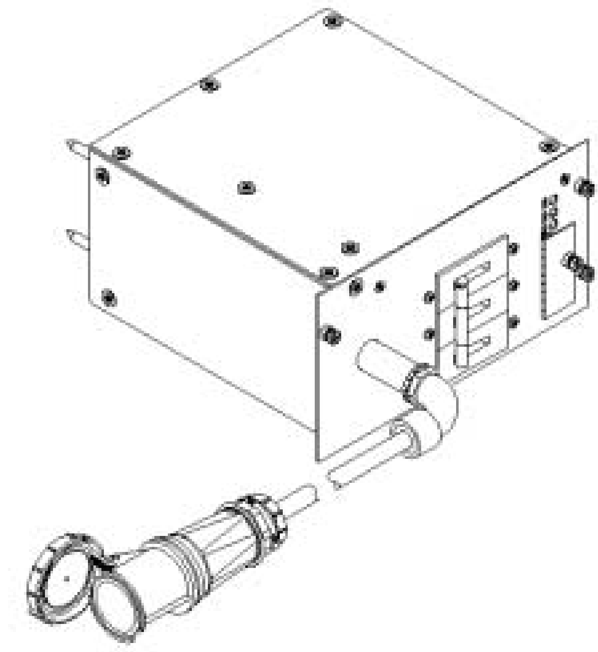


Figure 2-26 Four-Wire Connector

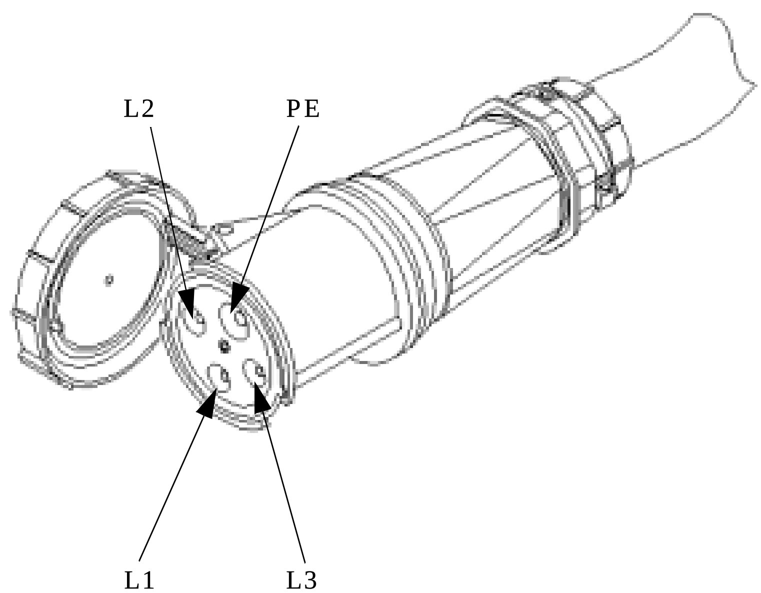
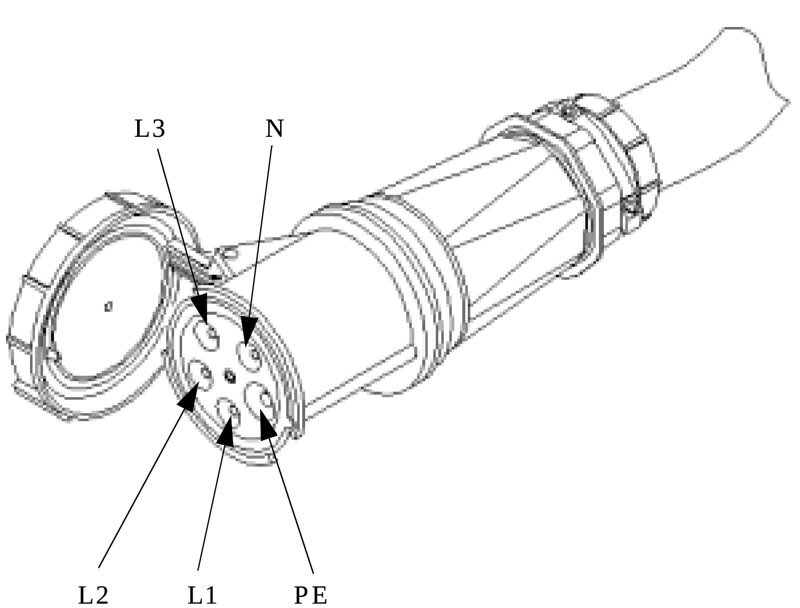


Figure 2-27 Five-Wire Connector



Use the following procedure to install the PDCA:

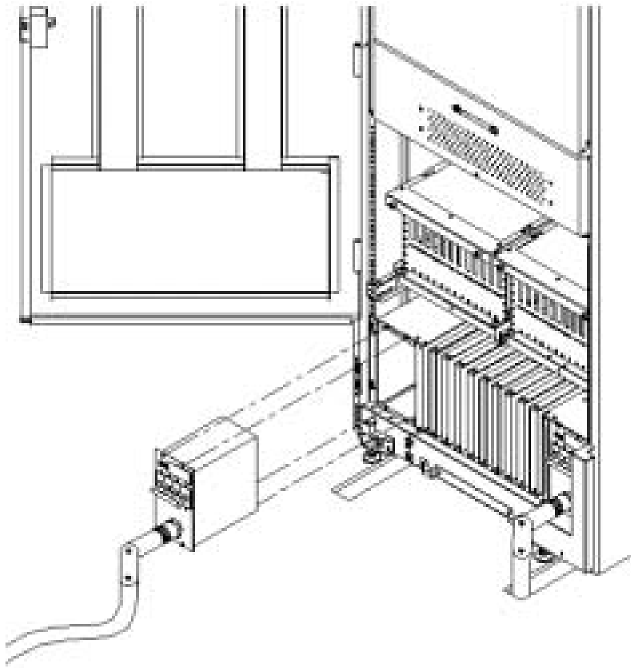
Step 1. Make sure the circuit breaker on the PDCA is **Off**.

Step 2. Remove the rear PDCA bezel by removing the four retaining screws.

Step 3. Run the power cord down through the appropriate opening in the floor tile.

Step 4. Insert the PDCA into its slot and secure with four screws.

Figure 2-28 Installing the PDCA



Step 5. Using a T20 Torx driver, attach the four screws that hold the PDCA in place.

Step 6. If required, repeat Step 3 through Step 5 for the second PDCA.

Step 7. Re-install the rear PDCA bezel.

CAUTION Do not check voltages with the PDCA breaker set to **On**. Make sure the electrical panel breaker is **On** and the PDCA breaker is **Off**.

Step 8. Plug in the PDCA connector.

Step 9. Check the voltage at the PDCA.

1. Using a T20 Torx driver, remove the screw on the hinged panel at the top of the PDCA. Refer to Figure 2-29.
2. Using a Volt-Ohm meter (VOM), check the following test points to make sure they conform to the specifications for the PDCA and local electrical specifications:

If the voltage values do not match the specifications, have the customer contact an electrician to troubleshoot the problem.

Figure 2-29 Checking PDCA Test Points (5-Wire)

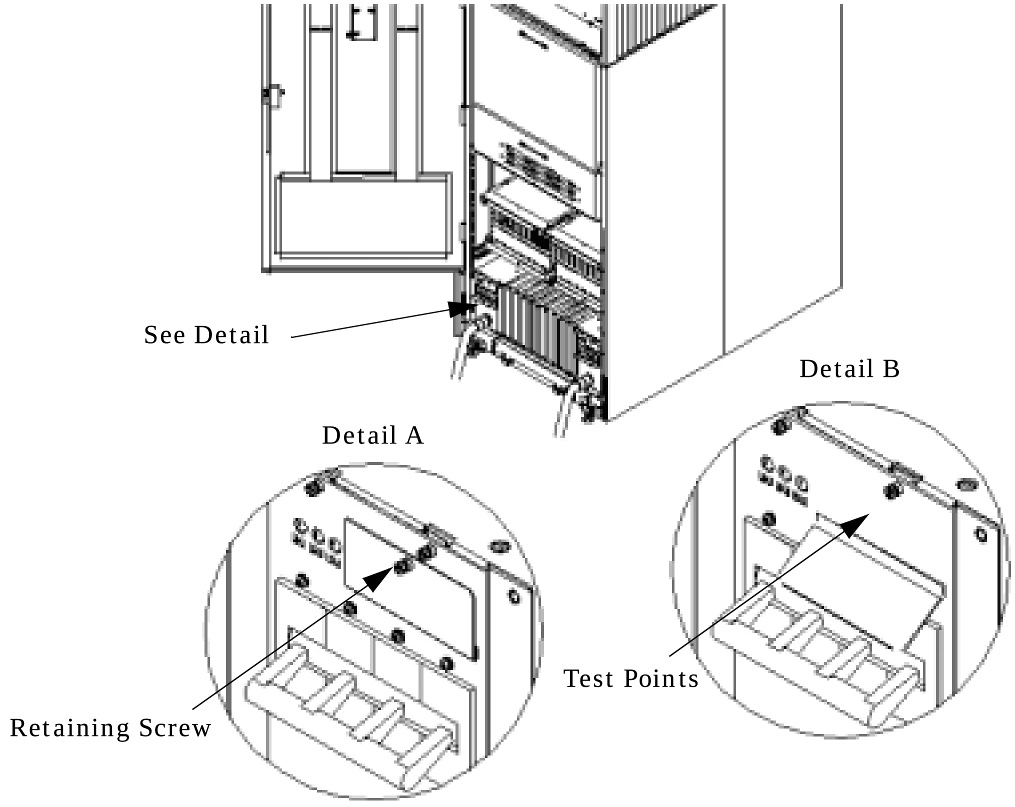


Table 2-3 4- and 5-Wire Voltage Ranges

4-Wire	5-Wire
L2 to L3: 200-240 V	L1 to N: 200-240 V
L2 to L1: 200-240 V	L2 to N: 200-240 V
L1 to L3: 200-240 V	L3 to N: 200-240 V
	N to Ground: [a]

a. Neutral to ground voltage can vary from millivolts to several volts depending on the distance to the ground/neutral bond at the transformer. Anything over 3 V should be investigated by a site prep or power specialists.

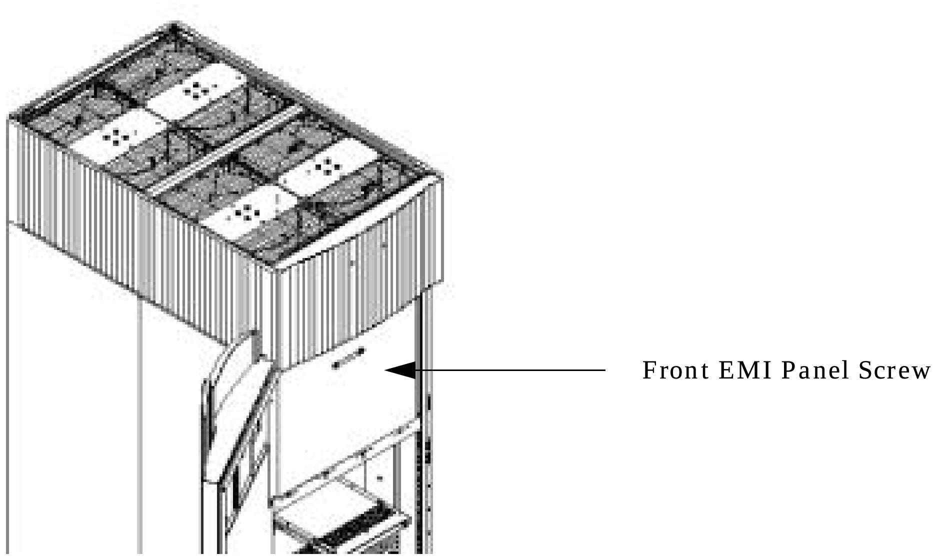
Removing the EMI Panels

Remove the front and back electromagnetic interference (EMI) panels to access ports and to visually check whether components are in place and the LEDs are properly illuminated when power is applied to the system.

To remove the front and back EMI panels:

Step 1. Using a T20 Torx driver, loosen the captive screw at the top center of the front EMI panel.

Figure 2-30Removing Front EMI Panel Screw

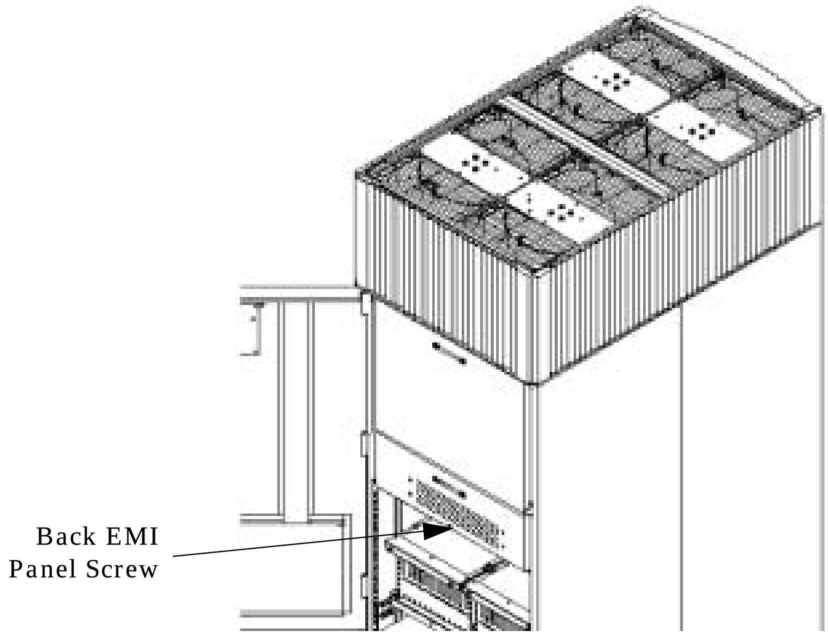


Step 2. Use the handle provided to remove the EMI panel and set it aside.

When in position, the EMI panels (front and back) are tightly in place. Removing them takes controlled, but firm, exertion.

Step 3. Loosen the captive screw at the lower center of the back EMI panel.

Figure 2-31 Removing the Back EMI Panel



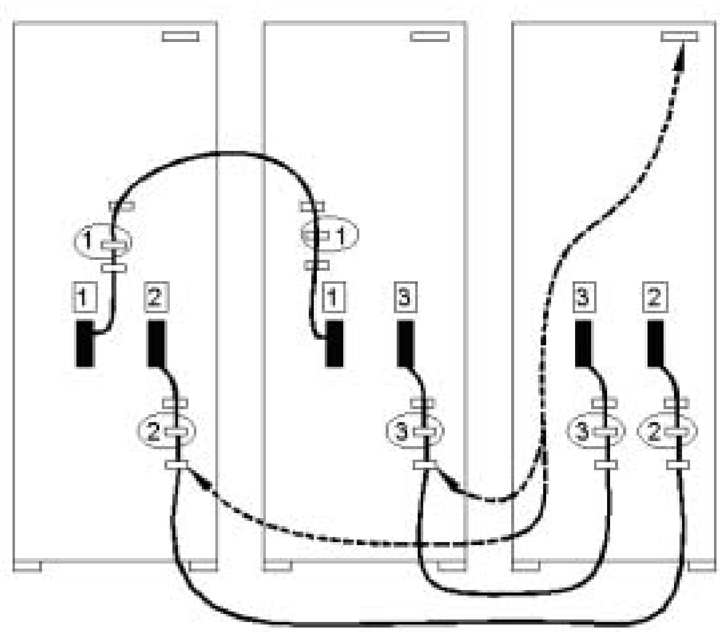
Step 4. Use the handle provided to gently remove the EMI panel; then, set it aside.

Connecting the Cables

The I/O cables are attached and tied inside the cabinet. When the system is installed, these cables must be untied, routed, and connected to the cabinets where the other end of the cables terminate. Use the following guidelines and Figure 2-32 to route and connect cables. For more information on cable routing, refer to “Routing I/O Cables” on page 54.

- Each cabinet is identified with a unique color. The cabinet color label is located at the top of the cabinet.
- The colored label closest to the cable connector corresponds to the color of the cabinet to which it is attached.
- The colored label farther away from the cable connector corresponds to the color of the cabinet where the other end of the cable is attached. In Figure 2-32, the dotted lines show where the label is located and where the cable terminates.
- Each cable is also labeled with a unique number. This number label is applied on both ends of the cable and near the port where the cable is to be connected. In Figure 2-32, the cable number labels are indicated by circled numbers and the cabinet port numbers are indicated with boxed numbers.

Figure 2-32 Cable Labeling

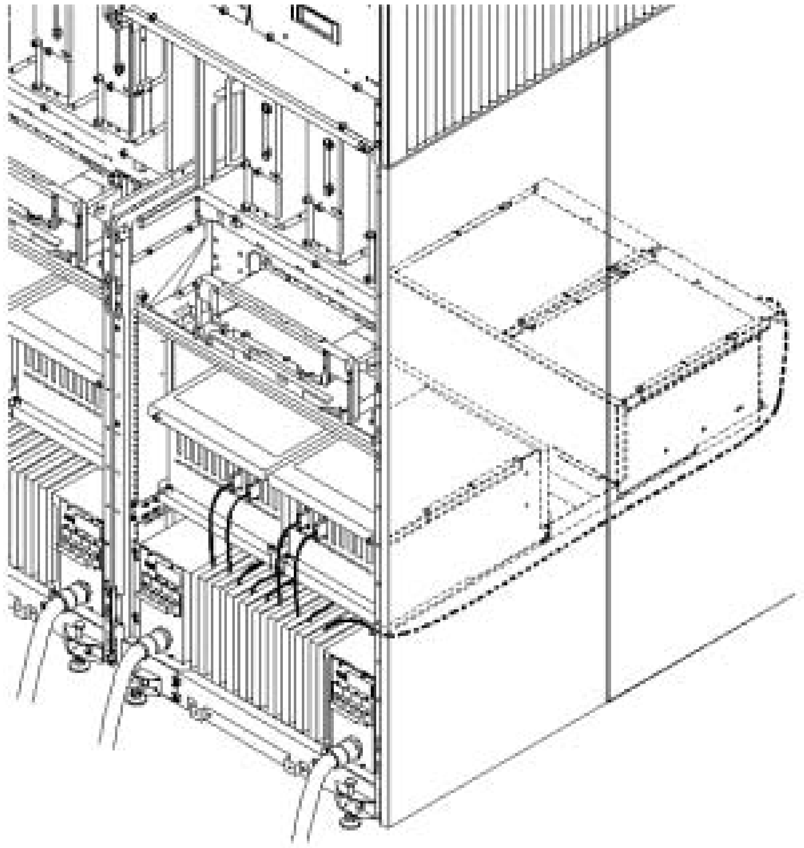


Routing I/O Cables

Routing the cables is a significant task in the installation process. It is important not only for the immediate need of completing the installation, but efficient cable routing is important when future service calls are made.

Neatness counts. The most efficient use of space is to route cables so that they are not crossed or tangled.

Figure 2-33 Routing I/O Cables



Use the following procedure and guidelines to route cables through the cable groomer at the bottom rear of the cabinet.

Step 1. Remove the cable access plate at the bottom of the groomer.

Step 2. Beginning at the front of the cabinet, route the cables using the following pattern:

1. Route the first cable on the left side of the left-most card cage first. Route it under the PCI-X card cage toward the back of the cabinet and down through the first slot at the right of the cable groomer.

2. Route the second cable on the left side of the left-most card cage to the right of the first cable, and so on, until routing all of the cables in the card cage is complete.

   The number and width of cables vary from system to system. Use judgement and the customer's present and estimated future needs to determine how many cables should be routed through each cable groomer slot.

3. After routing the left most card cage at the front of the cabinet, route the cables in right-most card cage at the back of the cabinet. Begin with the right cable in the card cage and work toward the left.

4. After routing the cables in right-most card cage at the rear of the cabinet, return to the front of the system and route the cables in the next card cage to the right.

5. Repeat the above pattern until all of the cables are routed.

Step 3. Connect the Management Processor (MP) cables last.

Step 4. Reattach the cable access plate at the bottom of the cable groomer.

Step 5. Reattach the cable groomer kick plate at the back of the cabinet.

Step 6. Slip the L bracket(s) under the power cord on the rear of the PDCA.

Step 7. While holding the L bracket in place, insert the PDCA completely into the cabinet and secure the L bracket with one screw.

Connecting the MP to the Customer LAN

This section discusses how to connect, set up, and verify the Superdome MP to the customer LAN. LAN information includes the MP network name (host name), the MP IP address, the subnet mask, and gateway address. This information is provided by the customer.

Connecting the MP to the Network

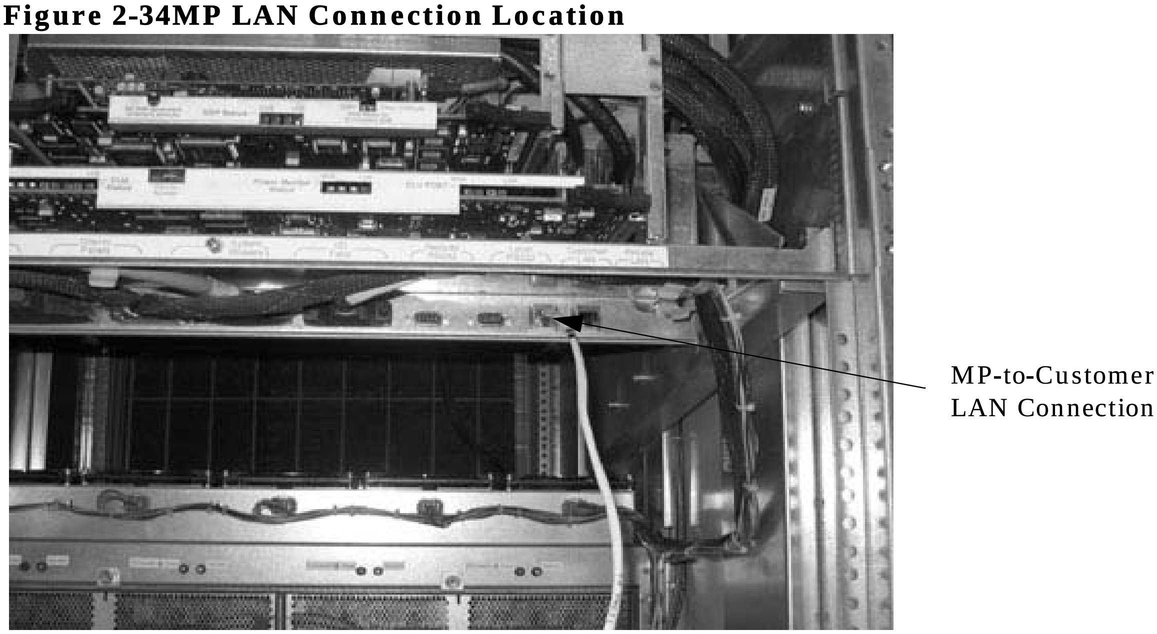
NOTE Unlike earlier Superdome systems, which required the MP to be connected to the private LAN, the new system MP now connects to the customer's LAN through the appropriate hub, switch, router, or any other customer-provide LAN device.

In some cases, the customer may want to connect the SMS to the MP on the private management LAN. This may be done, but the customer must be informed that they will not be able to access the SMS remotely and will have to use the SMS as a "local" device.

Connect the MP to the customer's LAN:

Step 1. Connect one end of the RJ-45 LAN cable to the LAN port on the MP.

Figure 2-34MP LAN Connection Location



Step 2. Connect the other end of the LAN cable to the customer-designated LAN port. Obtain the IP address for the MP from the customer.

Connect dial-up modem cable between the MP modem and the customer's phone line connection.

Setting Customer IP Address

NOTE The default IP address for the Customer LAN port on the MP is **192.168.1.1.**

To set the customer LAN IP address:

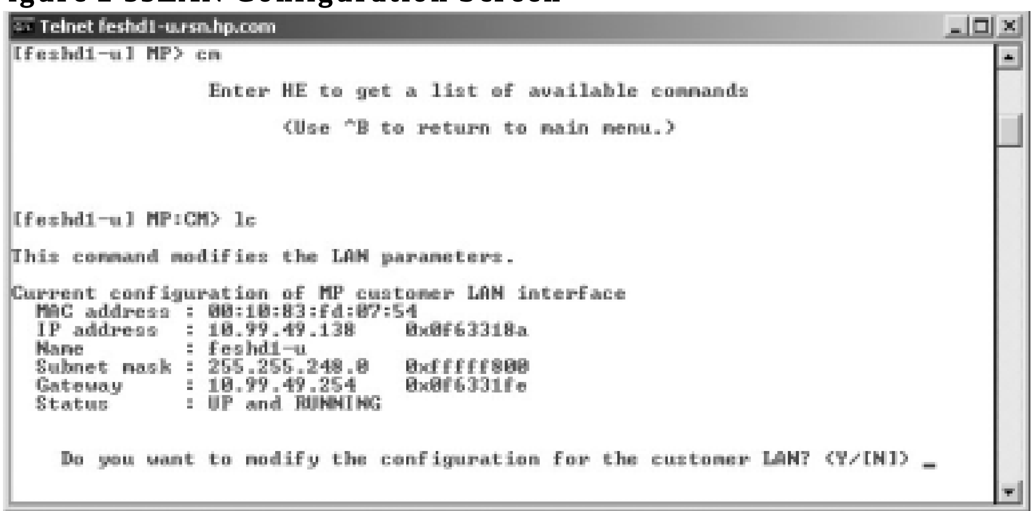
Step 1. From the MP Command Menu prompt (*MP:CM>*), enter ***lc*** (for LAN Configuration).

The screen displays the default values and asks if you want to modify them. It is a good idea to write down the information, as it may be required for future troubleshooting.

If you are not already in the Command Menu, enter ***ma*** to return to the Main Menu, then enter ***cm***

When you enter ***lc***, the following screen appears:

Figure 2-35LAN Configuration Screen



If the LAN software on the MP is working properly, it should see the message: "LAN status: UP and RUNNING." The value in the "IP address" field has been set at the factory. You will need to get the customer LAN IP addresses from the customer.

NOTE The customer LAN IP address is designated LAN Port 0.

Step 2. The prompt will ask if you want to modify the LAN port 0; enter ***y***.

The current Customer IP address is shown; then the following prompt appears: *Do you want to modify it? (Y/[N])*

Step 3. Enter ***y***.

Step 4. Enter the new IP address.

The customer should provide this address for LAN Port 0.

Step 5. Confirm the new address.

Step 6. Enter the MP Network Name.

This is the host name for the customer LAN. You can use any name you like. The name can be as many as 64 characters, and include alpha numerics, - (dash), _ (under bar), . (period), or a space. It is recommended that the name be a derivative of the complex name. For example, Acme.com_MP.

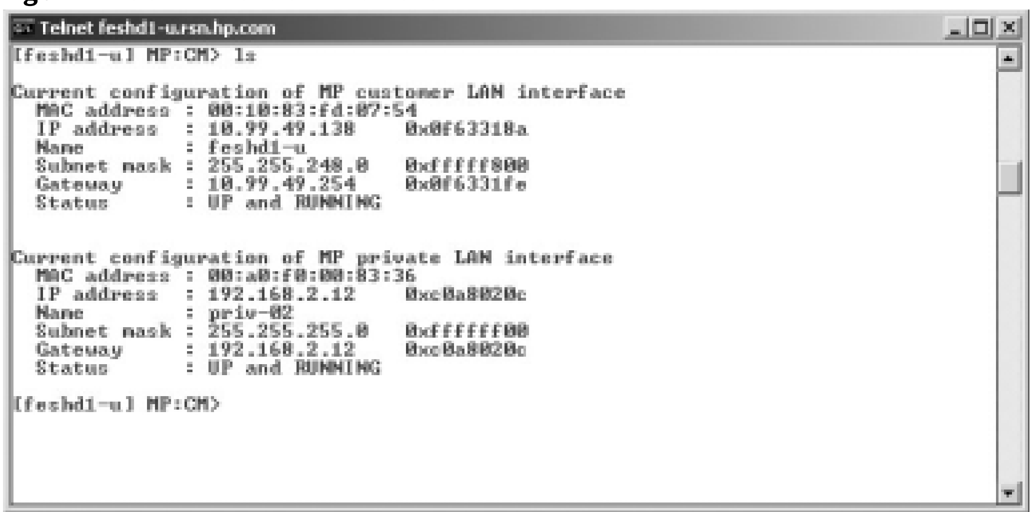
Step 7. Enter the LAN parameters for *Subnet mask* and *Gateway address*.

This information should come from the customer.

Step 8. To check the LAN parameters and status, enter the *ls* command at the MP Command Menu prompt (*MP:CM>*).

A screen similar to the following appears:

Figure 2-36The ls Command Screen



To return to the MP main menu, enter ***ma***.

To exit the MP, enter ***x*** at the MP main menu.

Turning On Housekeeping Power

Step 1. Verify that the AC voltage at the input source is within specifications for each cabinet being installed.

Step 2. Ensure that:

- The AC breakers are in the Off position. See Figure 2-37.
- The cabinet power switch at the front of the cabinet is in the Off position.
- The AC breakers and cabinet switches on the I/O Expansion Cabinet (if one is present) are in the Off position.

Step 3. If the complex has an IOX cabinet, power on this cabinet first.

Step 4. Turn on the AC breakers on the PDCA(s) at the back of the each cabinet.

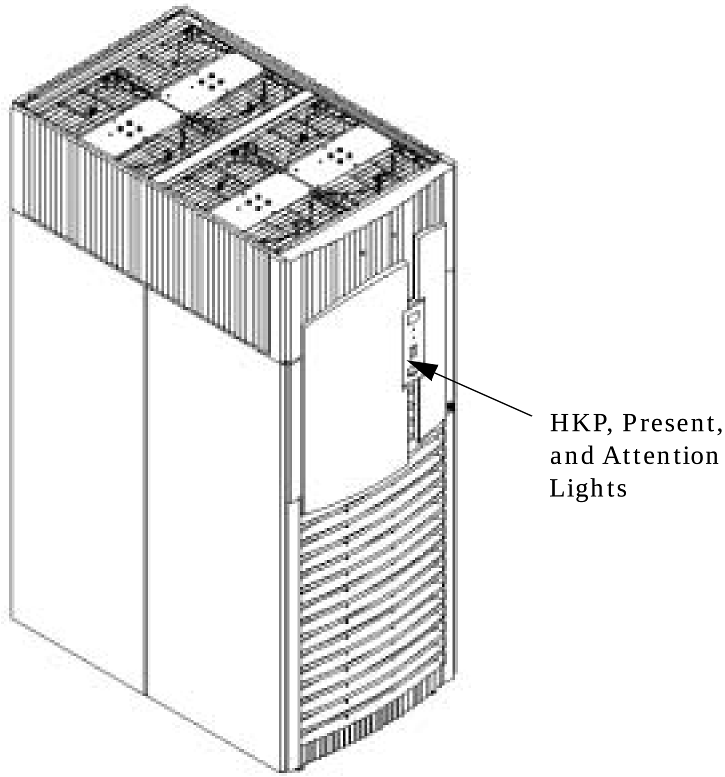
In a large complex cabinets should be powered on in one of the two following orders: 9, 8, 1, 0 or 8, 9, 0, 1.

On the front and back panel, the HKP and the Present lights should illuminate.

On cabinet 0, the HKP and the Present lights illuminate, but only the HKP LED illuminates on cabinet 1 (the right cabinet).

NOTE The 48-volt switch on the front panel should be off at this time.

Figure 2-37Front Panel Display with Housekeeping (HKP) Power On, and Present Indicators

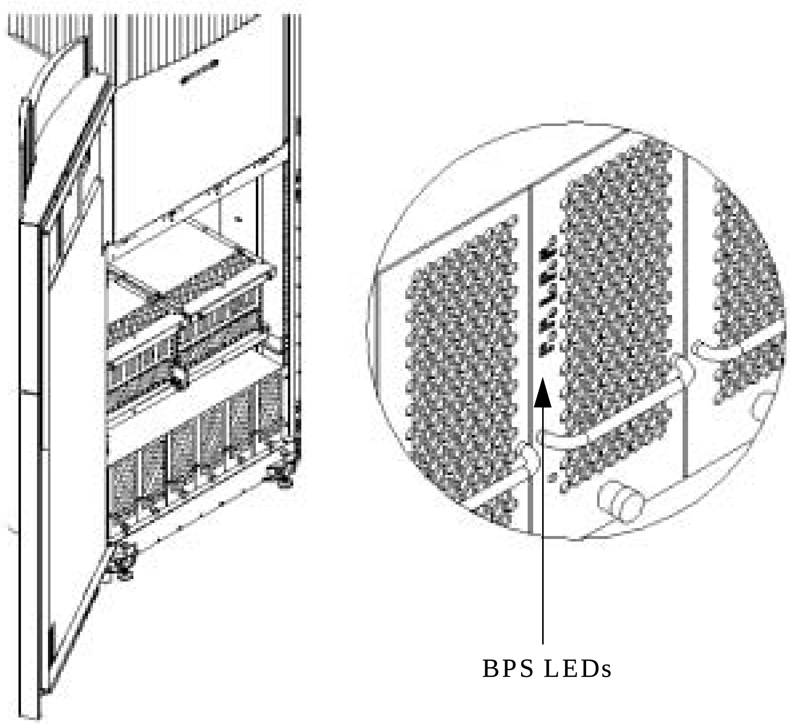


Step 5. Check the BPS LEDs.

When on, the breakers on the PDCA distribute power to the BPSs. AC power is present at the BPSs when:

- The amber light on the BPS next to the label AC0 Present (if the breakers on the PDCA on the left side at the back of the cabinet) is on.
- The amber light on the BPS next to the label AC1 Present (if the breakers on the PDCA on the right side at the back of the cabinet) is on.

Figure 2-38BPS LEDs



Booting and Verifying the System

After the system has been installed, it should be verified that the proper hardware is installed and booted.

This section describes how to power on the cabinet; and boot and test each partition. A console window must be open for each partition. Two additional windows should also be open: one window for initiating reset on partitions and the other for monitoring system partition status. In each window the MP is initiated.

NOTE The HKP should be ON and the 48-volt switch on the front panel should be OFF at this time. Refer to section “Turning On Housekeeping Power” on page 60 for turning on the HKP.

Connecting to the Management Processor

Before powering on the cabinet, several windows must be open and connected to the MP. Then the 48 volts is switched on and each partition is booted to the EFI prompt.

Step 1. On the SMS, open the required number of command-prompt windows:

- One “console” window for each partition (MP CO option)
- One for initializing RS command from the MP
- One for monitoring partition status (MP VFP option)

In each window connect to the MP by entering:

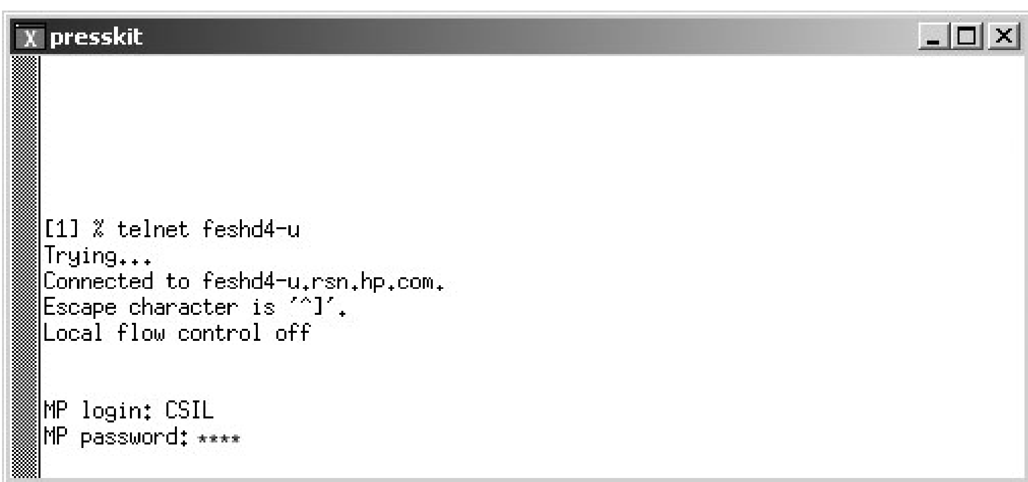
telnet <MP hostname>

or

telnet <IP address>

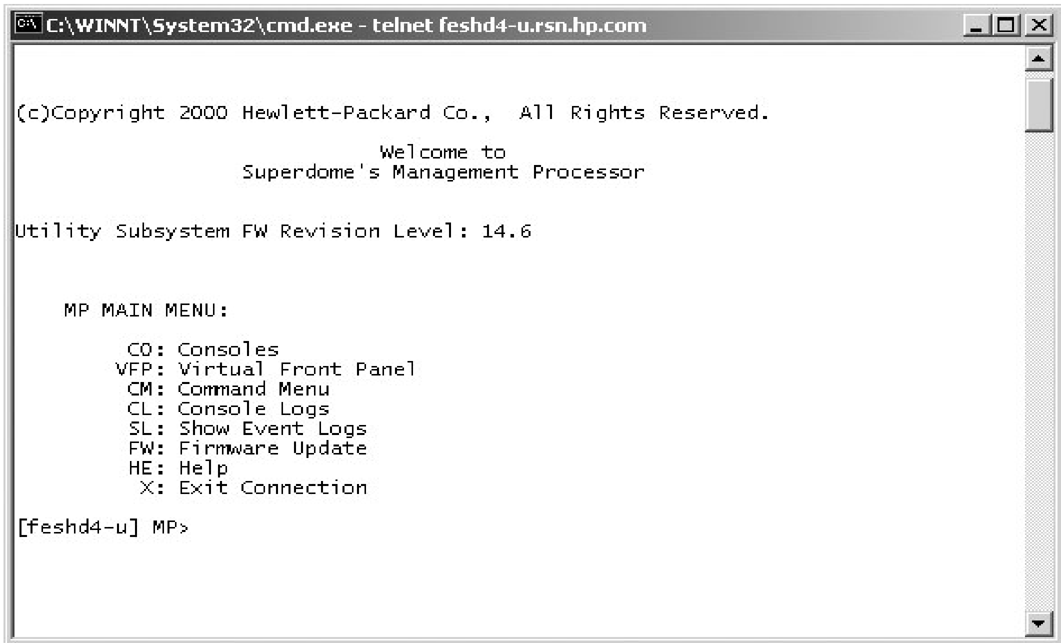
Step 2. Enter the appropriate login and password at the *MP* prompt.

Figure 2-39Connecting to Host



The MP main menu appears as shown in Figure 2-40.

Figure 2-40Main MP Menu



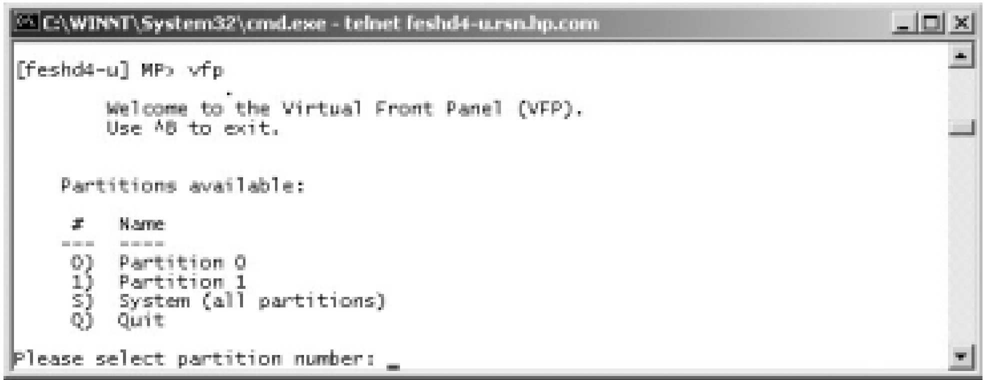
Step 3. Repeat the first two steps for each partition required.

Step 4. In one window, bring up the command prompt by entering ***cm*** at the *MP* prompt, as shown in Figure 2-41.

Figure 2-41MP Command Option

Step 5. In the another window, bring up the virtual front panel by entering ***vfp***, as shown in Figure 2-42. Use this window to observe partition status.

Figure 2-42MP Virtual Front Panel

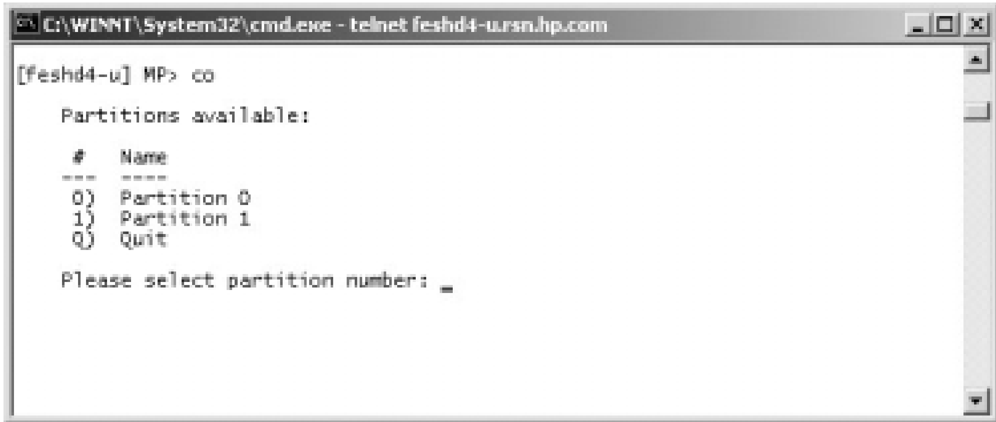


Step 6. From the VFP menu, enter ***s*** to select the whole system or the partition number to select a particular partition. An output similar to that shown in Figure 2-43 should appear. In this example, no status should be listed, because the system 48 volts has not been switched on.

Figure 2-43Example of Partition State—Cabinet Not Powered Up

Step 7. For each of the remaining windows, bring up the partition console for each partition by enter ***co*** at the MP prompt, as shown in Figure 2-44. These windows should be blank. If not, the information in them means nothing at this point, because the cabinet is powered off.

Figure 2-44MP Console Option



Powering on the System 48 Volts

Step 1. Switch on the 48-volt supply from each cabinet front panel.

If the complex has an IOX cabinet, power on this cabinet first.

In a large complex cabinets should be powered on in one of the two following orders: 9, 8, 1, 0 or 8, 9, 0, 1.

IMPORTANT The MP should be running in each window.

As the cabinet boots, the partition(s) activity can be observed in the window displaying the VFP.

Step 2. For hp Integrity Superdome systems, follow the procedure in “Booting hp Integrity Superdome to EFI Shell” on page 67.

For hp 9000 Superdome systems, follow the procedure in “Booting hp 9000 to BCH Shell” on page 69.

Booting hp Integrity Superdome to EFI Shell

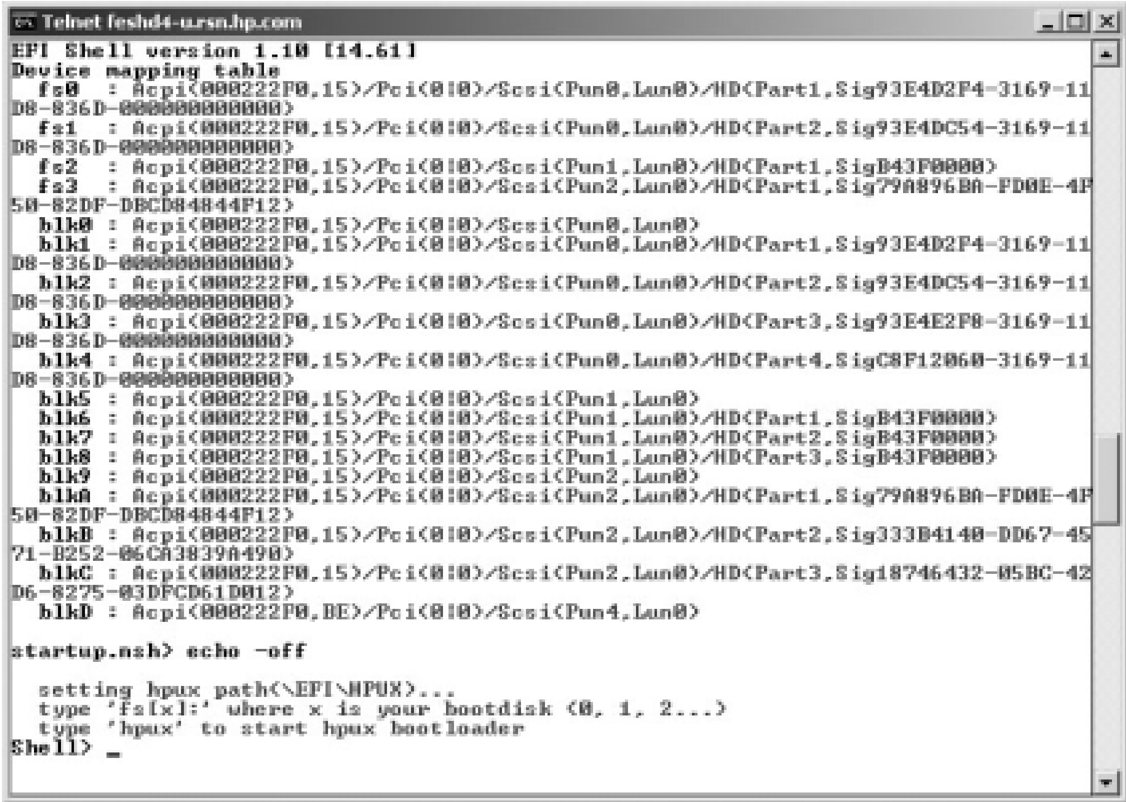
After powering on (or using the CM *bo* command), all partition console windows will show activity while the firmware is initialized and will stop momentarily at an Boot Manager menu.

Figure 2-45hp Integrity Superdome EFI Boot Manager

Use the up-down arrows on the keyboard to highlight `EFI Shell (Built-in)` and press enter. Do this for all partitions.

For all partitions, after selecting EFI Shell and pressing enter, much activity is viewed in the console window, but it will cease and the EFI shell prompt appears as shown in Figure 2-46.

Figure 2-46 EFI Shell Prompt



NOTE If autoboot is enabled for an nPartition, it must be interrupted to stop the boot process at the firmware console: EFI on hp Integrity Superdome and BCH on hp 9000 Superdome.

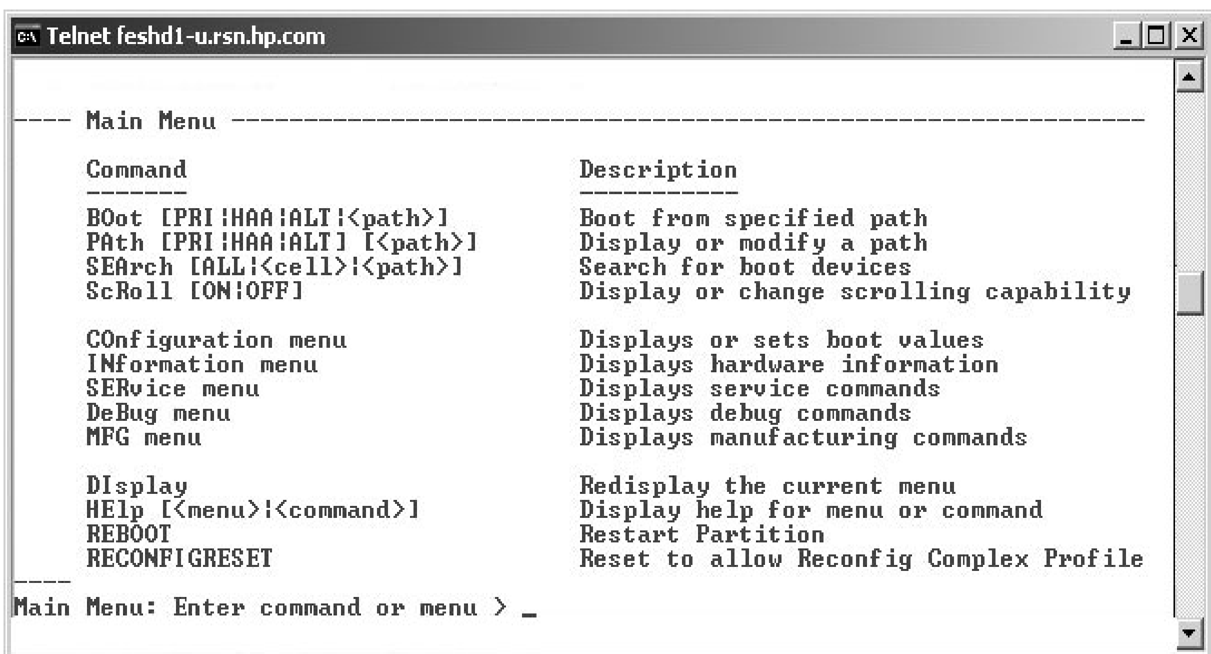
At this point, the virtual front panel indicates that each partition is at system firmware console as indicated in Figure 2-47.

Figure 2-47 hp Integrity Superdome Partitions at System Firmware Console

Booting hp 9000 to BCH Shell

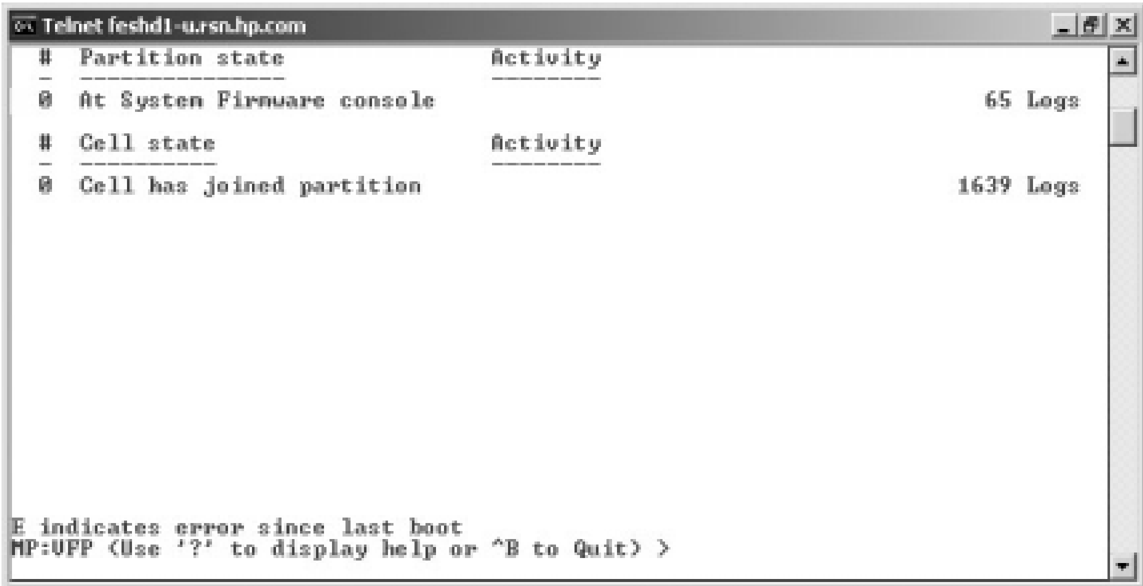
After powering on (or using the CM *bo* command), all partition console windows will show activity while the firmware is initialized and will stop at the BCH menu shown in Figure 2-48.

Figure 2-48hp 9000 Superdome BCH Main Menu



At this point, the virtual front panel indicates that each partition is at system firmware console as indicated in Figure 2-49.

Figure 2-49 hp 9000 Superdome Virtual Front Panel

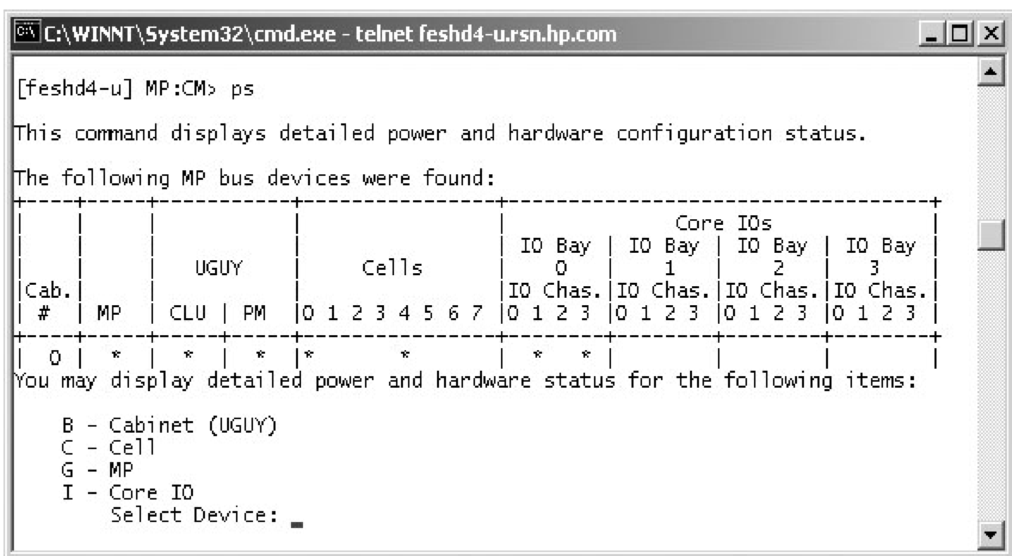


```
Telnet feshd1-u.rsn.hp.com
 #  Partition state              Activity
 -  ---------------              --------
 0  At System Firmware console                            65 Logs

 #  Cell state                   Activity
 -  ----------                   --------
 0  Cell has joined partition                           1639 Logs

E indicates error since last boot
MP:VFP (Use '?' to display help or ^B to Quit) >
```

Verifying the System

Step 1. From the *CM* prompt, enter ***ps*** to observe the power status. A status screen as shown in Figure 2-50 should appear.

Figure 2-50Power Status First Window



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

[feshd4-u] MP:CM> ps

This command displays detailed power and hardware configuration status.

The following MP bus devices were found:
+----+-----+-----------+----------------+-----------------------------------+
|    |     |           |                |              Core IOs             |
|    |     |           |                | IO Bay | IO Bay | IO Bay | IO Bay |
|    |     |   UGUY    |     Cells      |   0    |   1    |   2    |   3    |
|Cab.|     |           |                |IO Chas.|IO Chas.|IO Chas.|IO Chas.|
| #  | MP  | CLU | PM  |0 1 2 3 4 5 6 7 |0 1 2 3 |0 1 2 3 |0 1 2 3 |0 1 2 3 |
+----+-----+-----+-----+----------------+--------+--------+--------+--------+
|  0 |  *  |  *  |  *  |*       *       | *   *  |        |        |        |
You may display detailed power and hardware status for the following items:

    B - Cabinet (UGUY)
    C - Cell
    G - MP
    I - Core IO
        Select Device: _
```

Step 2. At the “Select Device” prompt, enter ***B*** then the cabinet number to check the power status of the cabinet. Observe that the Power Switch: on and Power: enabled as shown in Figure 2-51.

Figure 2-51Power Status Window

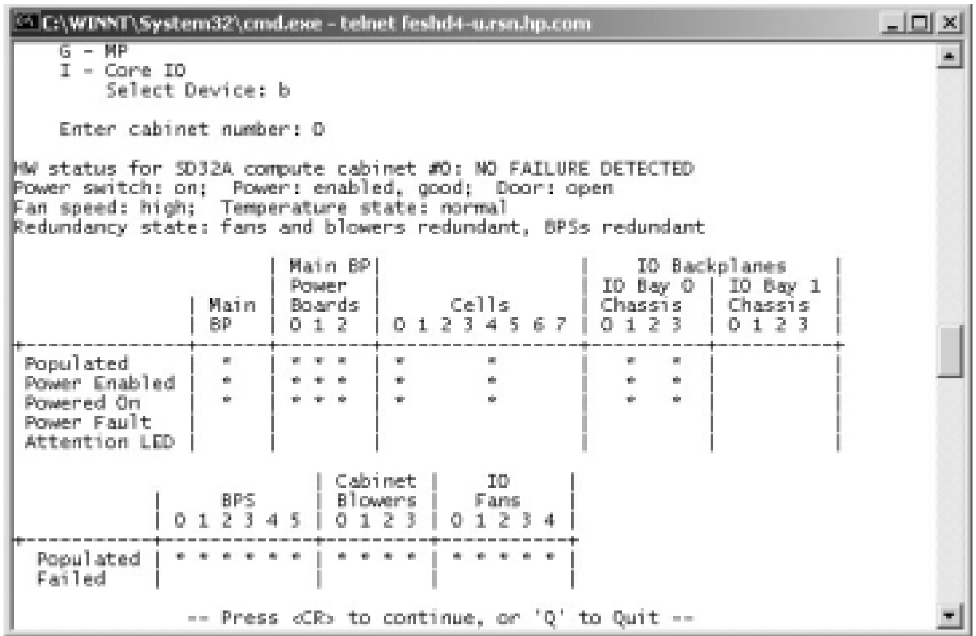
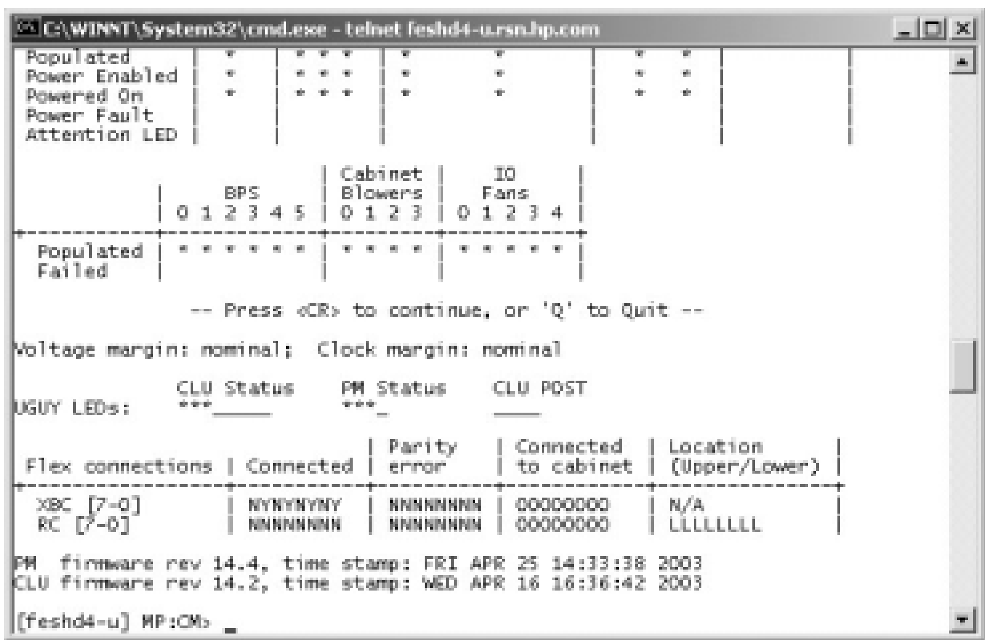


Figure 2-51 shows that cells are installed in slots 0 and 4. In the cabinet, there should be cells physically located in slots 0 and 4.

Step 3. Enter ***ps*** from the Command Menu, or if proceeding from Step 2.in the previous section, simply press **<CR>** one more time to observe the status as shown in Figure 2-52.

Figure 2-52Power Status Showing State of UGUY LEDs (and other status)



Step 4. Verify that there is an * in the columns marked MP, CLU, and PM.

IMPORTANT An * appears in the MP column only for cabinet 0; that is, the cabinet containing the MP. There is only one cabinet that contains the MP, and that is cabinet 0.

Verify that there is an * for each of the cells installed in the cabinet, by comparing what is in the *Cells* column with the cells located inside the cabinet.

Running JET Software

The JTAG Utility for Scan Tests (JUST) Exploration Tool, or JET, collects system information for each system on a network and places it in files for use by other scan tools. JET gathers configuration data by executing a series of queries targeted at the MP and the CLU portion of the UGUY board.

JET is described in Appendix G, “JUST Exploration Tool,” on page 275.

IMPORTANT Any problems encountered must be resolved before booting the operating system.

Power Cycling After Using JET

Whenever JUST has been run, system power must be recycled, because the off-line diagnostic can deallocate the CPUs.

Remove 48 Volts via the MP command, *pe*, then cycle the AC breakers on the rear of the cabinet(s). See Appendix B, Powering On and Off the System, for details on power cycling the system

If the complex has any IOX cabinet(s), IDs 8 or 9, it is very important to power cycle these cabinet(s) in the proper sequence.

Attaching Rear Kick Plates

Kick plates serve the practical purpose of protecting cables from accidentally being disconnected or damaged, as well as add an attractive cosmetic touch to the cabinet. There are three metal pieces to attach to the bottom rear of the cabinet.

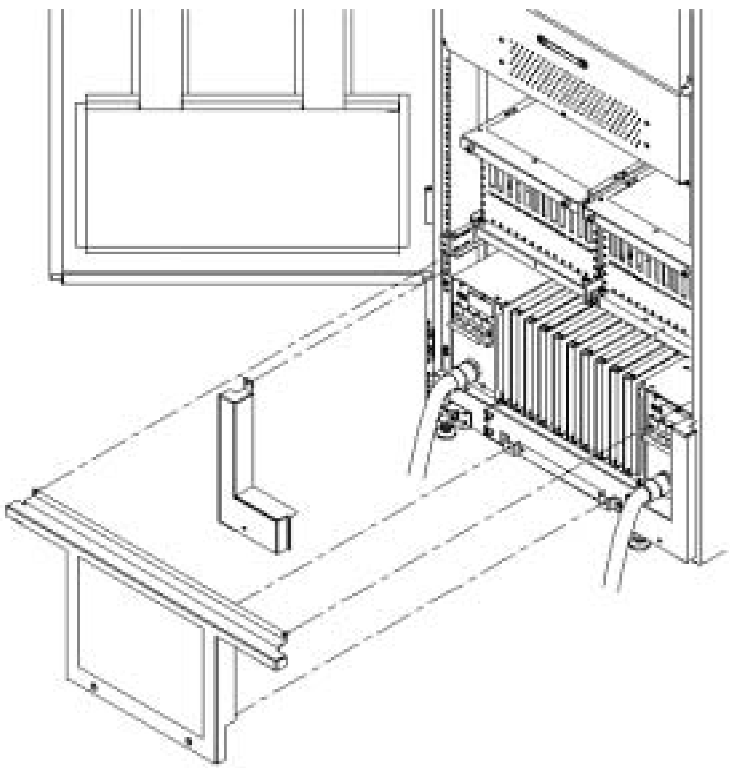
To install the kick plates:

Step 1. Hold the left kick plate (A5201-0671) in position and attach a clip nut (0590-2318) on the cabinet column next to the hole in the flange at the top of the kick plate.

Step 2. Using a screw (0515-0671) and a T25 Torx driver, attach the flange on the kick plate to the nut clip.

Step 3. Using a Torx 10 driver and a screw (0515-4271), attach the bottom of the kick plate to the center hole in the leveling foot.

Figure 2-53Attaching Rear Kick Plates



Step 4. Perform steps 1-3 on the right kick plate (A5201-00281).

Step 5. Position the upper flange of the center kick plate (A5201-00261) under the I/O tray's complementary mounting bracket (A5201-00402) so as to retain the center kick plate top flanges. No top screws are needed on the center kick plate due to bracket A5201-00402. This unsymmetrical bracket must be orientated with the hole located nearest the edge in the up position.

Step 6. Using a T20 Torx driver, tighten the thumbscrews at the bottom of the center kick plate.

Performing a Visual Inspection and Completing the Installation

After booting the system, carefully inspect it and reinstall the EMI covers. Here are the steps required to perform a final inspection and complete the installation:

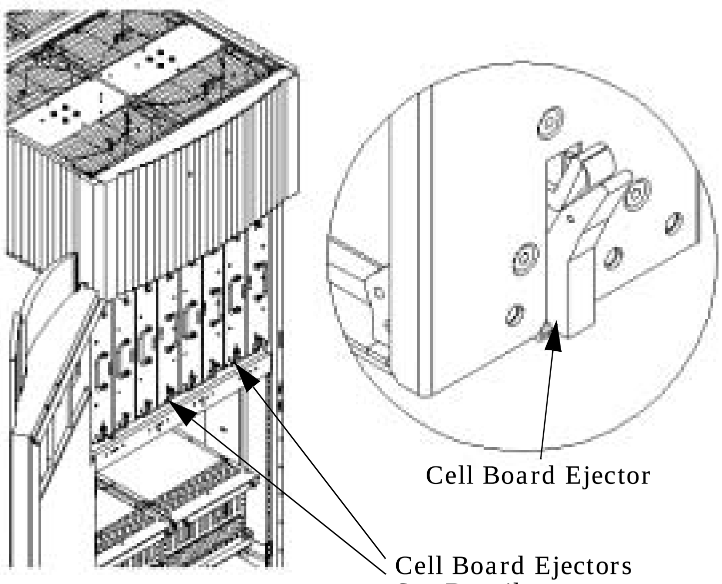
Step 1. Visually inspect the system to verify that all components are in place and secure.

Step 2. Check that the cables are secured and routed properly.

Step 3. Check that the cell board ejectors are secure.

If the ejectors are broken or open, the cell board is disconnected.

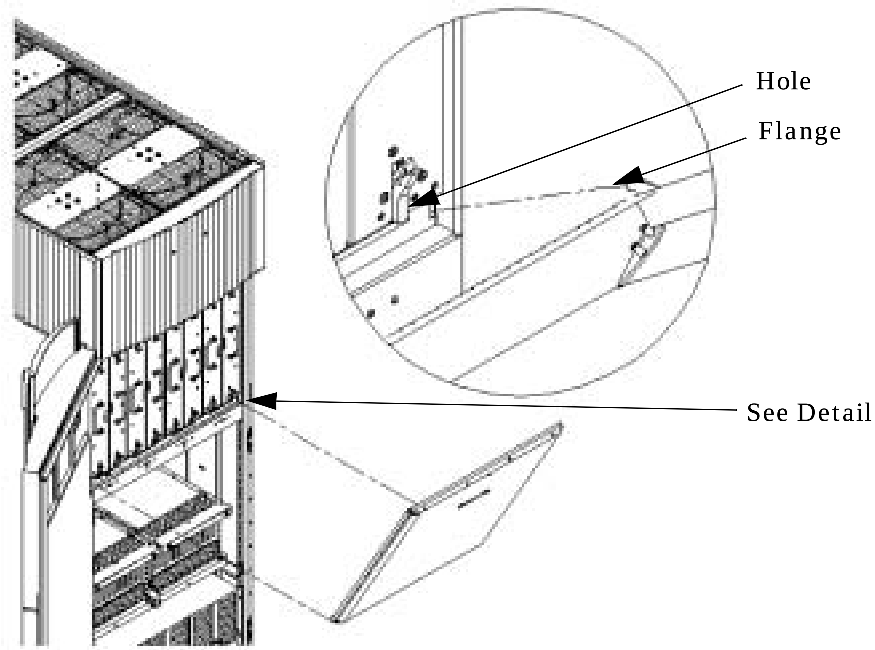
Figure 2-54Cell Board Ejectors7



Step 4. Reinstall the front EMI panel.

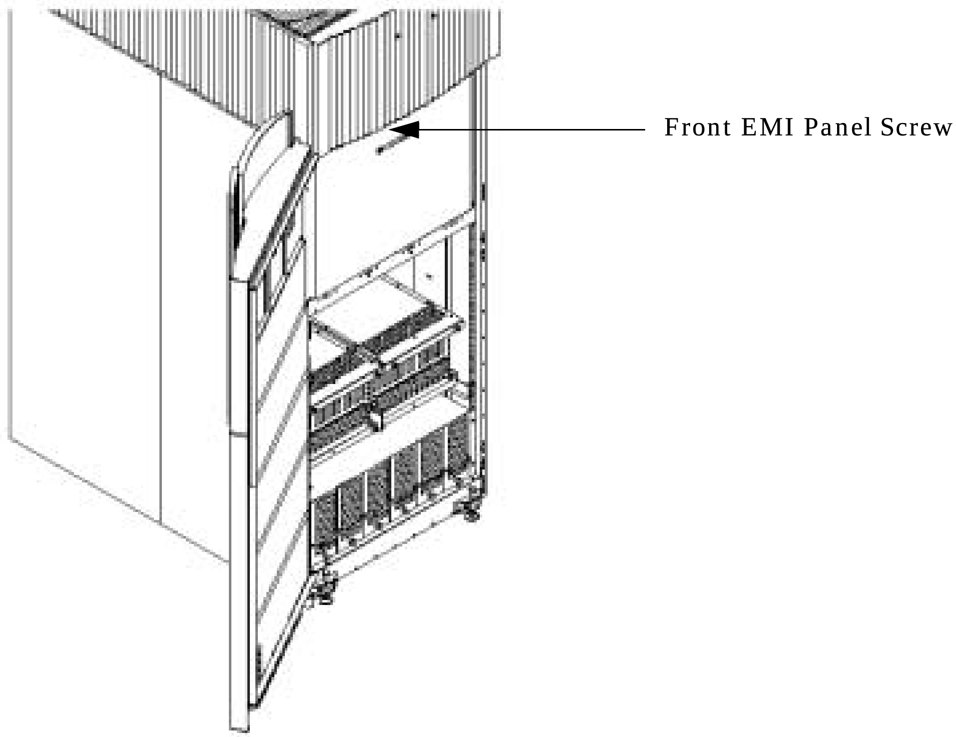
1. Hook the flange at the lower corners of the EMI panel into the holes on the cabinet.

Figure 2-55Front EMI Panel Flange and cabinet Holes



2. Position the panel at the top lip and lift the panel up while pushing the bottom into position. The EMI gasket may have to be compressed to get the panel to seat properly.
3. Reattach the screw at the top of the EMI panel.

Figure 2-56Attaching Front EMI Panel

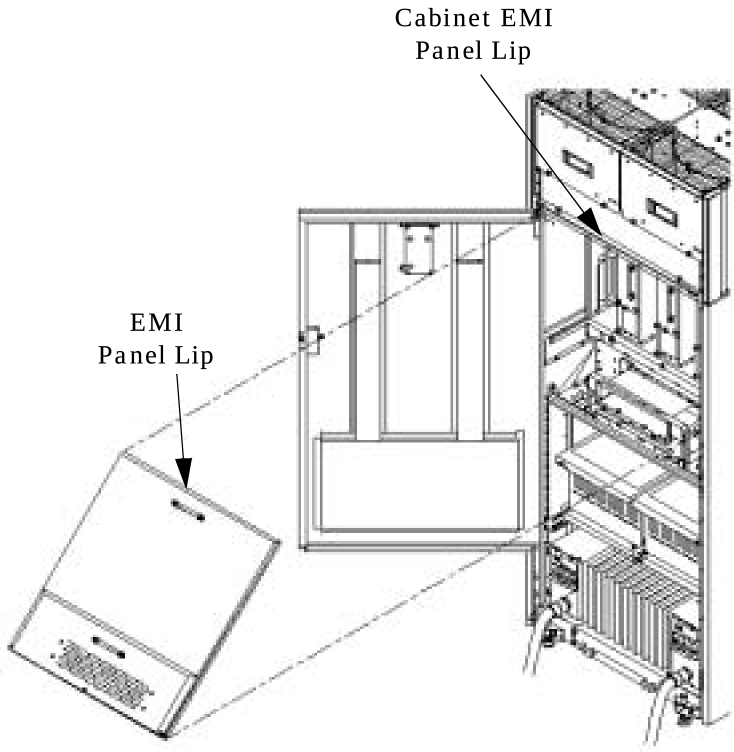


Step 5. Check that the cables inside the rear enclosure are secure.

Step 6. Reinstall the back EMI panel.

1. Align the lip inside the cabinet with the lip on the EMI Panel.

Figure 2-57Reinstalling the Back EMI Panel



2. Push the EMI panel up and in. The EMI gasket may have to be compressed at the top of the enclosure to get the panel to seat properly.

3. Reattach the screw at the bottom of the EMI panel.

Post-System-Installation Check

After the system has been installed in a computer room and verified, conduct the post installation check. Before turning the system over to the customer, it is important to inspect the system visually and clean up the installation area. Do the following:

- **Inspect circuit boards.** Check that all circuit boards are installed and properly seated and that the circuit board retainers are reinstalled.
- **Inspect cabling.** Check that all cables are installed, secured, and properly routed.
- **Inspect test points.** Check that test leads are removed from the test points, and that the test points are properly covered.
- **Clean up and dispose of debris.** Remove all debris from the area, and dispose of it properly.
- **Perform final check.** Inspect the area to ensure that all parts, tools, and other items used to install the system are disposed of properly. Then close and lock the doors.
- **Enter information in the Gold Book.** When the installation and cleanup are complete, make the appropriate notations in the Gold Book, which should have been shipped with the system.
- **Obtain customer acceptance (if required).** This includes thanking the customer for choosing Hewlett-Packard.

3 Removing and Replacing Components

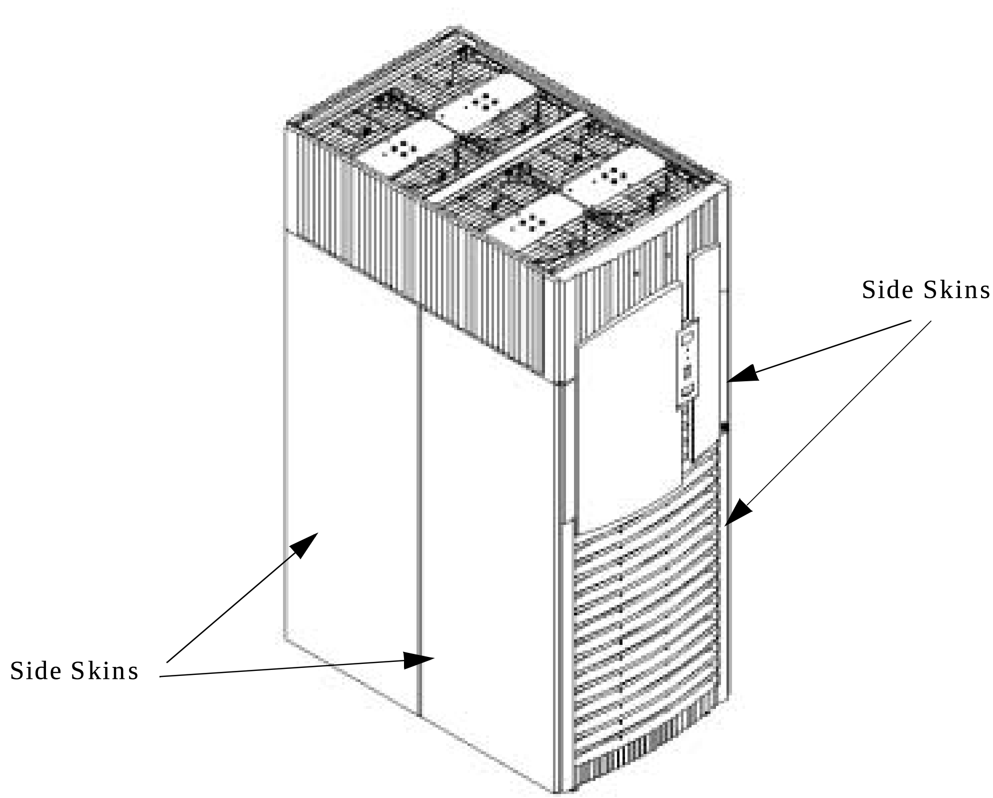
Powering Down and Powering Up the System

Throughout this chapter, as well as in other places in this book, there steps that require powering down or power up the system. All instructions for these task are covered in Appendix B, “Powering On and Off the System,” on page 199.

Removing and Replacing the Cabinet Side Skins

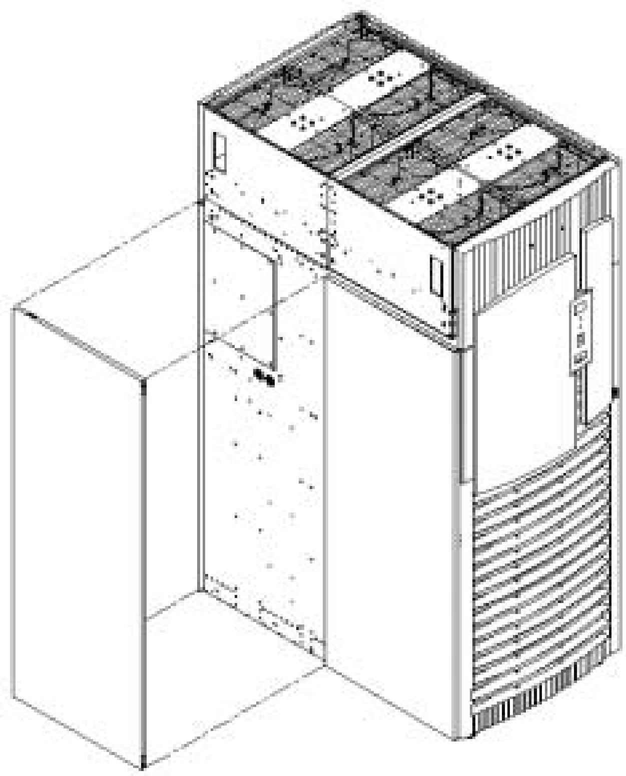
The cabinet side skins are identical for the right and left sides. There are four side skins, two on each side. These skins are easily replaced.

Figure 3-1 Cabinet Side Skins location



Removing the Cabinet Side Skins

Figure 3-2 Cabinet Side Skins Detail



Slide the first cabinet side skin forward and off the cabinet rail. If both skins are to be removed from one side, repeat this step.

Replacing the Cabinet Side Skins

Position the side skin so the rail on the skin aligns with the rail on the cabinet. Gently slide the skin into position until it is seated on the cabinet.

Removing and Replacing the Front Electromagnetic Interference (EMI) Cover

There is an EMI (Electromagnetic Interference) cover on the front of the cabinet. This cover is secured with one captive screw in the lower center of the cover.

Removing the Front EMI Cover

Step 1. Open the front cabinet door.

Step 2. Loosen the single slotted T-25 captive screw in the lower center of the EMI cover.

Step 3. Using the handle on the EMI cover, tilt the cover away from the chassis at the captive screw edge.

Step 4. Remove the cover from the chassis.

Replacing the Front EMI Cover

Step 1. Place the EMI cover onto the chassis, leaving the cover tilted outward from the chassis at the captive side.

Step 2. Rotate the cover into position flush with the chassis frame.

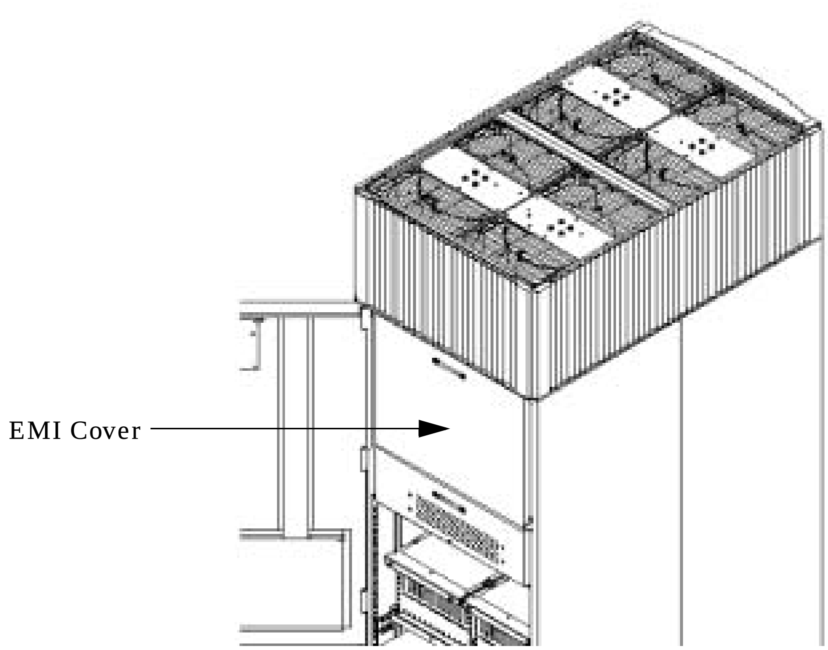
Step 3. Tighten the single captive screw in the lower center of the EMI cover.

Step 4. Close the front cabinet door.

Removing and Replacing the Rear Electromagnetic Interference (EMI) Cover

There is an EMI (Electromagnetic Interference) cover on the rear of the cabinet. This cover is secured with one captive screw in the lower center of the cover. The screw can be seen through the hole in the lower center of the cover. Care should be taken so as not to damage the EMI gasket on the cover. This cover is easily removed.

Figure 3-3 Rear EMI Cover Location



Removing the Rear EMI Cover

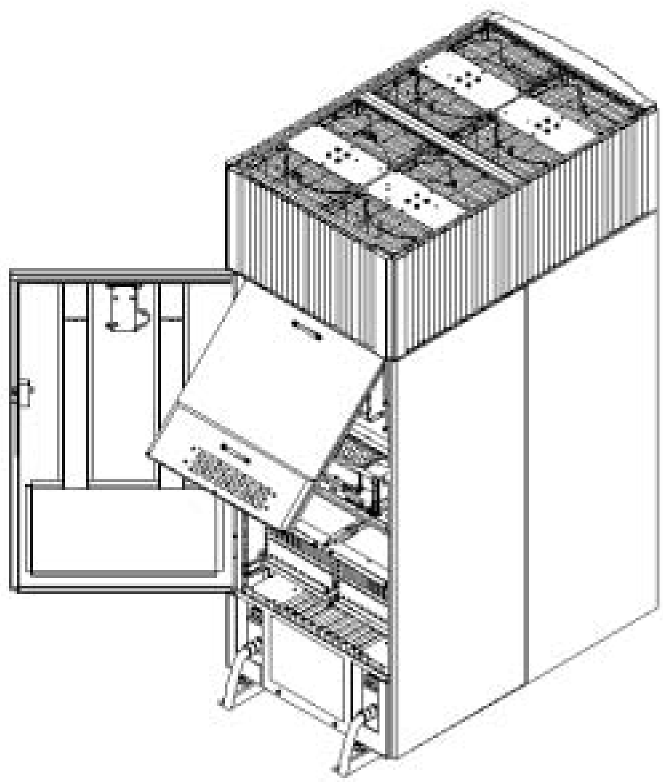
Step 1. Open the rear cabinet door.

Step 2. Loosen the single slotted T-25 captive screw in the lower center of the EMI cover.

Step 3. Using the handle on the EMI panel, tilt the cover away from the chassis at the captive screw edge.

Step 4. Remove the cover from the chassis.

Figure 3-4 Rear EMI Cover Detail



Replacing the Rear EMI Cover

The rear cover is held in place at the top by a channel in the cover that slides into a lip on the chassis.

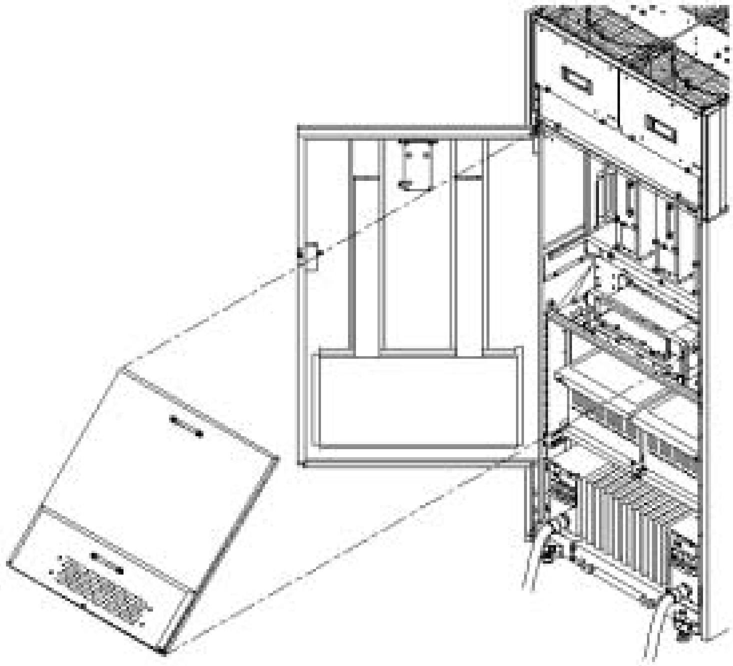
Step 1. Push the top of the cover into the lip and rotate the cover into position flush with the chassis frame.

Step 2. Tighten the single captive screw in the lower center of the EMI cover.

Step 3. Close the rear cabinet door.

CAUTION Take care not to damage the EMI gasket on the cover.

Figure 3-5 Rear EMI Cover Installation



Removing and Replacing the Side EMI Covers (for a two cabinet system)

There are two EMI covers on the sides of the cabinet. These covers are in place for the cable configuration in a two cabinet system. Side EMI covers are secured with two screws in rear side of the cover. Care should be taken not to damage the EMI gasket on the covers. These covers are easily removed.

Removing the Side EMI Covers

Step 1. Remove the front and rear blower bezels.

Step 2. Remove the side bezel bracket from the front and rear.

Step 3. Lift the side blower bezel off.

This allows the side skin to be removed.

Step 4. Remove the rear cell EMI panel.

Step 5. Release the side skin by removing the T-5 screws from top and bottom of the skin.

Step 6. Remove the side skins by sliding it forward along the rails.

Step 7. Remove the two T-5 screws holding the side EMI panel in place and sliding the shield forward.

Replacing the Side EMI Covers

Step 1. Slide the EMI cover into the slot on the rear of the chassis.

Make sure it is fully seated and flush with chassis frame.

Step 2. Secure the shield in place with the two T-5 screws at the top and bottom.

Step 3. Transfer the door latch to the new EMI panel using the two T-20 screws.

Step 4. Install side skins.

Step 5. Install the blower bezels.

Step 6. Close and latch the rear cabinet door.

CAUTION Do not damage the EMI gasket on the cover.

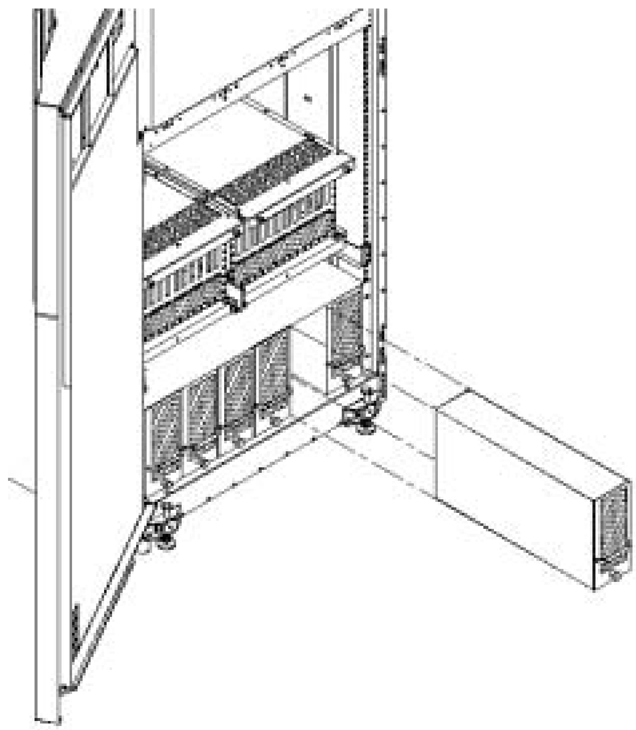
Removing and Replacing the Bulk Power Supply (BPS)

The Bulk Power Supply (BPS) is located in the front end power system (FEPS). The BPS is an N+1 component and is easily replaced.

Removing the Bulk Power Supply

This section contains information on removing a BPS.

Figure 3-6 BPS detail



Step 1. Loosen the single captive thumbscrew in the lower front center portion of the BPS.

Step 2. Slide the power supply forward using the handle to remove it from the FEPS.

Step 3. Make note that the BPS is defective for future reference.

Replacing the Bulk Power Supply

Step 1. Grip the handle with one hand while supporting the rear of the BPS in the other hand and insert the BPS into the same slot from which it was removed.

Step 2. The BPS easily slides into the FEPS; however, use a slow firm pressure to properly seat the connection.

Step 3. Tighten the single captive thumbscrew in the lower center of the BPS.

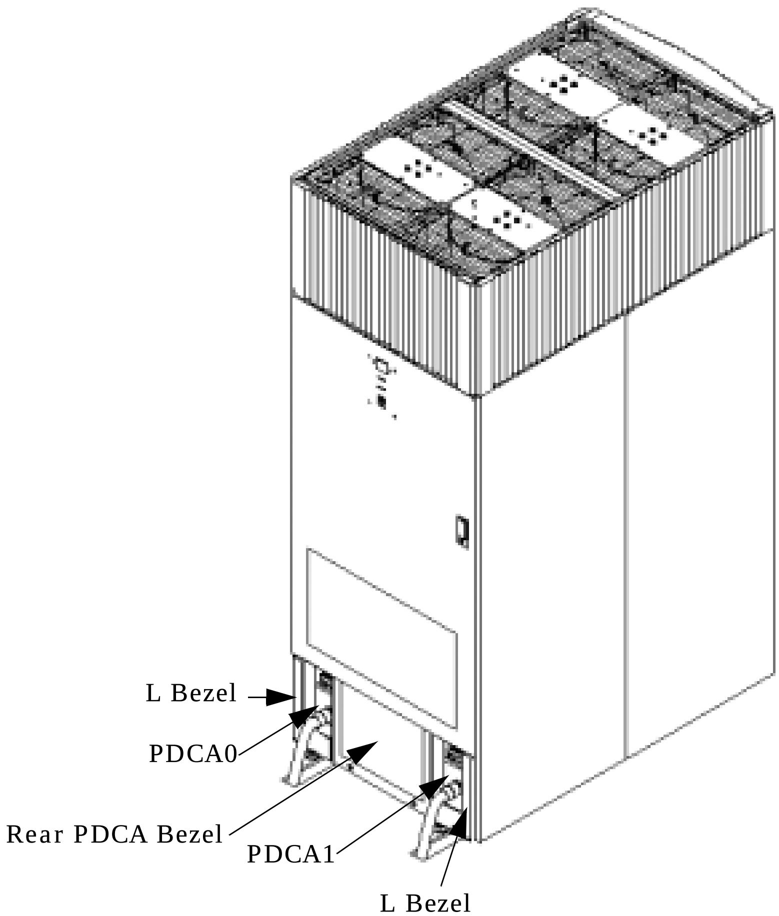
NOTE Do not over tighten the captive thumbscrew.

Installing An Additional Power Distribution Control Assembly

Adding additional capacity to an existing system requires careful consideration and planning. A Solution Implementation Plan (SIP) should be developed before visiting the customer site.

Figure 3-7 shows a cabinet with both PDCAs installed. PDCA 0 is the first PDCA. PDCA 1 is the position of the additional PDCA.

Figure 3-7 PDCA Locations



Adding the Option 6 or Option 7 PDCAs

To add the Option 6 or Option 7 PDCA:

Step 1. Shut down the server.

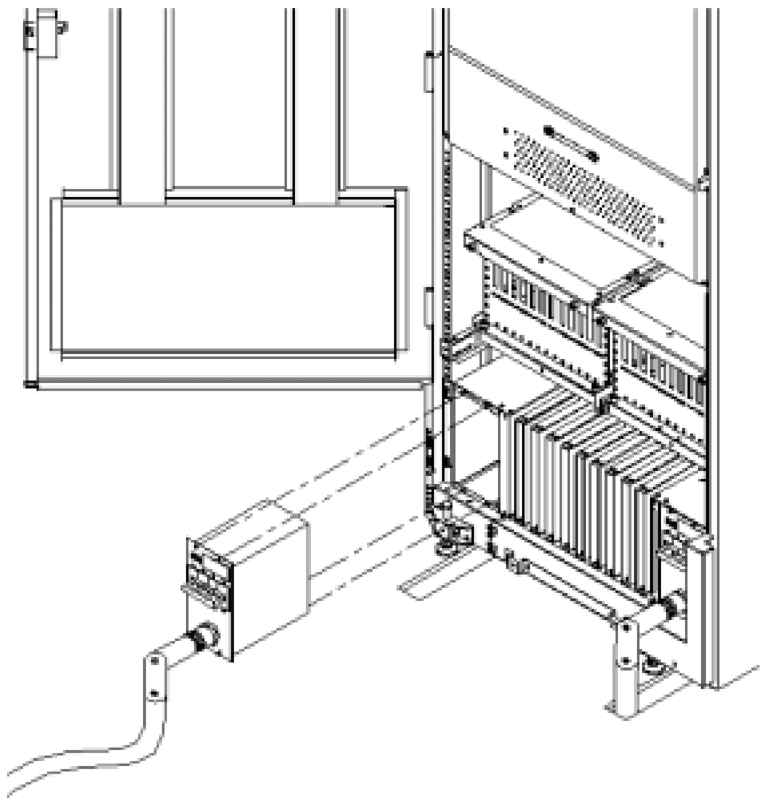
Step 2. Power off the AC supply to the server.

Step 3. Remove the power plug from the power source.

Step 4. Install the new PDCA into the server.

1. Run the power cord down through the appropriate opening in the floor tile.
2. Partially insert the PDCA into its slot.
3. Slip the L bracket under the power cord on the rear of the PDCA.
4. While holding the L bracket in place, insert the PDCA completely into the cabinet and secure the L bracket with one screw.

Figure 3-8 Installing the PDCA



5. Using a T20 Torx driver, attach the four screws that hold the PDCA in place.

Step 5. Plug the power cord into the AC power source.

Step 6. Power on the AC supply to the server.

Step 7. Power on and boot up the server.

Removing and Replacing the Front-End Power Supply

To remove the Front-End Power Supply (FEPS), turn off all breakers and remove power from the wall panel. Remove all PDCAs and BPSs. Mark and remove all cables from the FEPS.

Slide out the old FEPS and replace with the new one.

Removing Power From the Cabinet

Step 1. Power down all partitions and operating systems following the procedures in Appendix B, “Powering On and Off the System.”

Step 2. Power OFF the housekeeping voltage by turning off the cabinet breakers.

Step 3. Turn OFF all breakers at the wall panel associated with the cabinet.

WARNING **Ensure that all electrical circuits to the cabinet have been opened.**

Removing the FEPS from the Cabinet

Step 1. Make proper electrostatic discharge (ESD) connections.

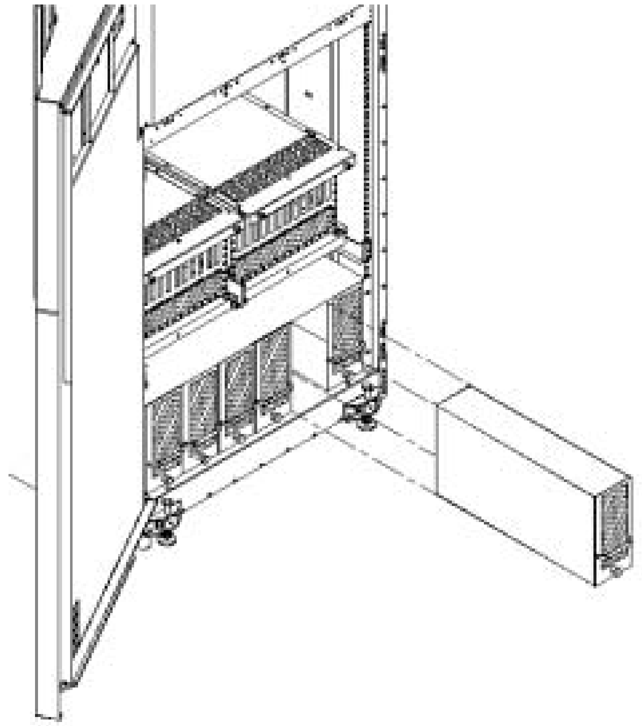
Step 2. Open the front and rear cabinet doors.

Step 3. Remove all BPSs from the front of the FEPS.

Perform the following steps for each BPS:

1. Loosen the single captive thumbscrew in the lower front center portion of the BPS.
2. Slide the power supply forward using the handle to remove it from the FEPS.

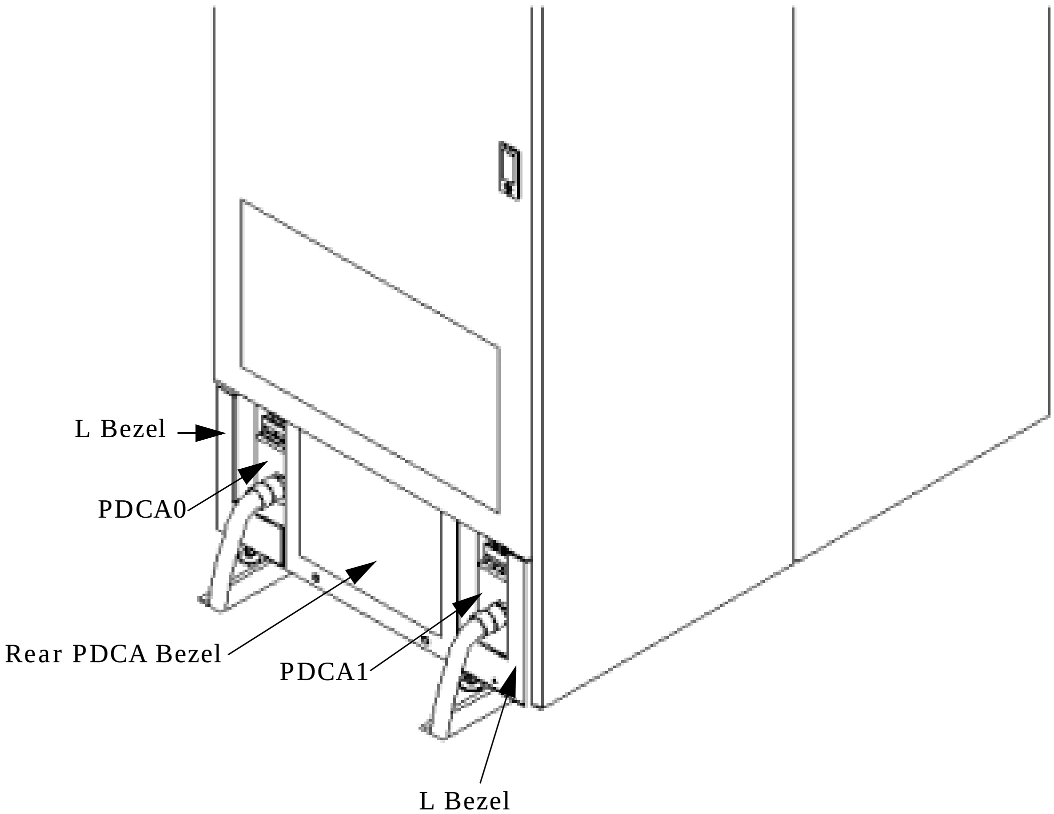
Figure 3-9Removing the BPSs



Step 4. Remove the rear PDCA Bezel.

This exposes the cable groomer.

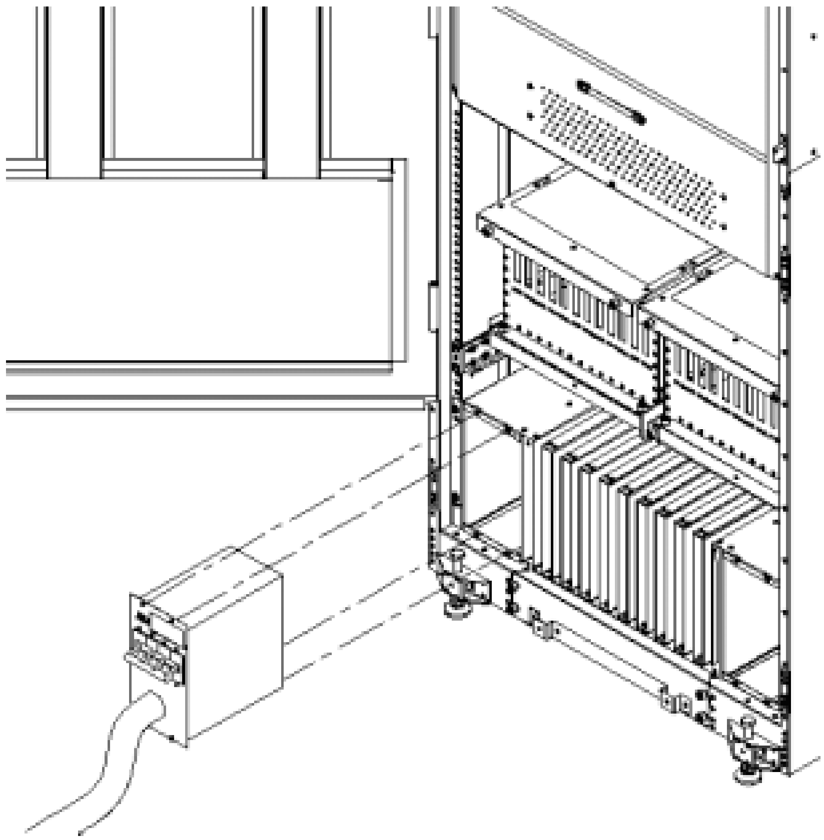
Figure 3-10 PDCA Locations



Step 5. Remove PDCAs using the following procedure for each.

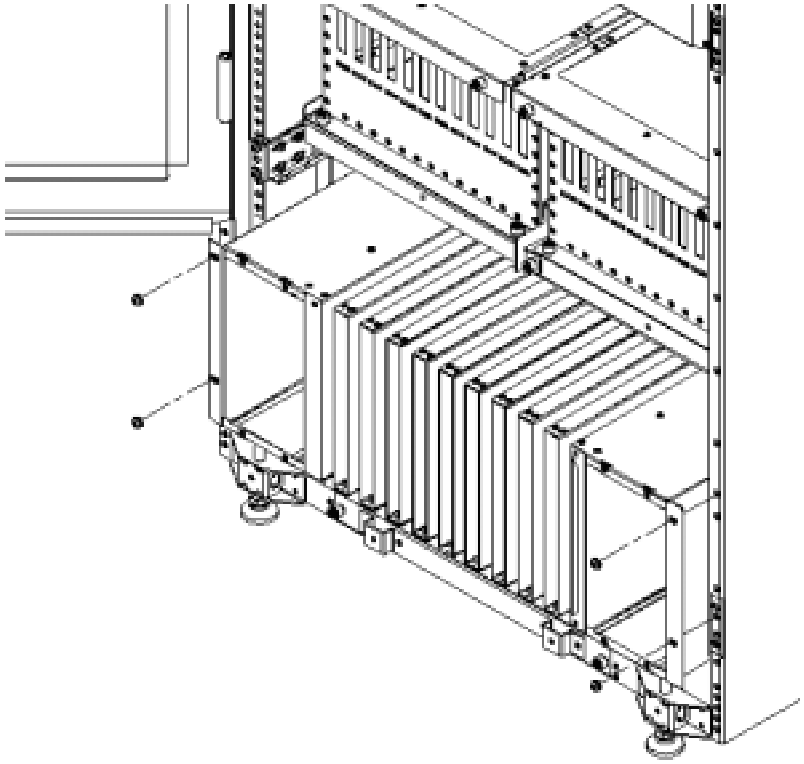
1. Remove the L bezel.
2. Using a T15 Torx driver, loosen the four captive screws that hold the PDCA in place.
3. Pull the PDCA from the FEPS chassis and carefully set it on the tile beside the cabinet.

Figure 3-11 Removing the PDCAs



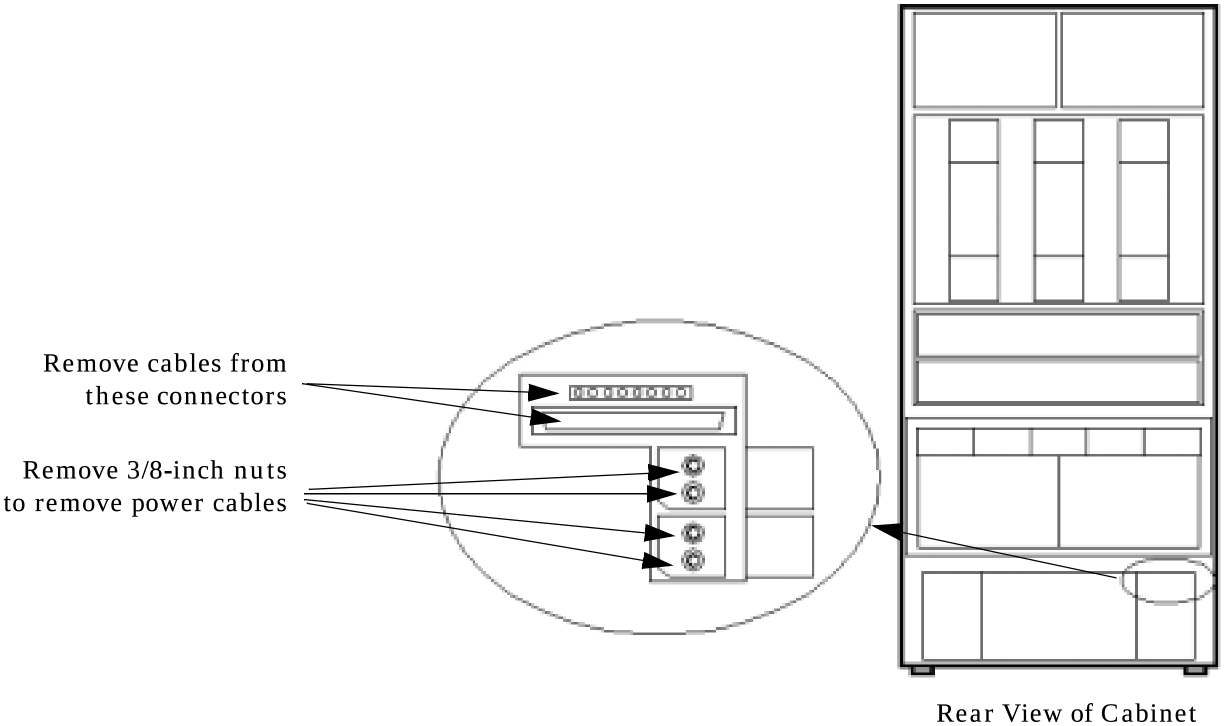
Step 6. Remove the cable groomer by removing the four Torx T20 screws that secure it in the cabinet.

Figure 3-12Removing the Cable Groomer



Step 7. Unplug the two cables from the FEPS.

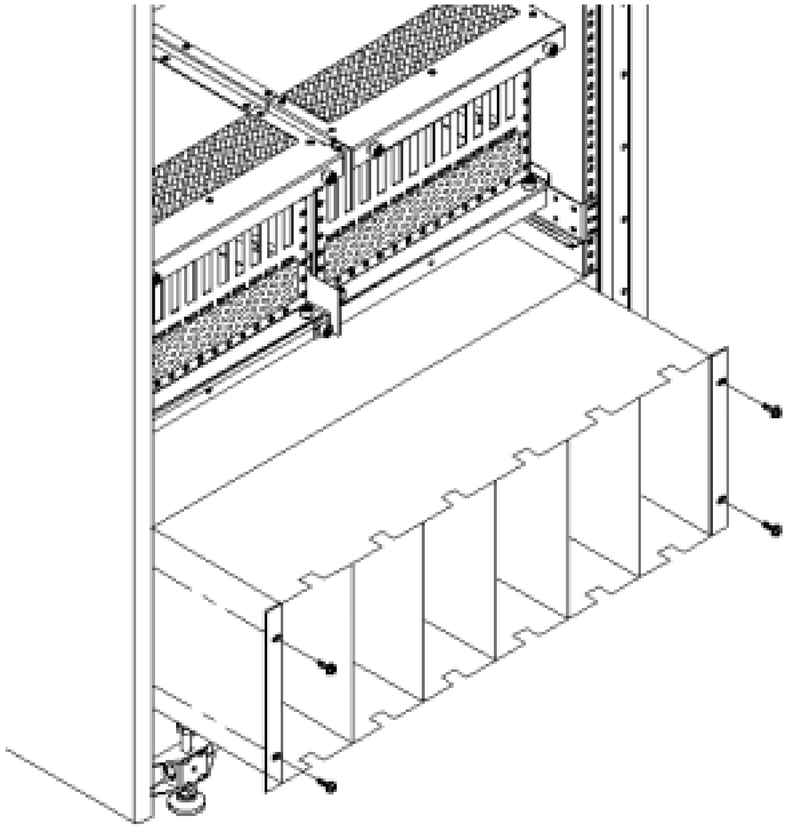
Figure 3-13Removing the Cables and Bus Bar Hardware from the FEPS



Step 8. Remove the 3/8-inch nuts and washers securing the heavy leads onto the power busbar and mark and remove all of the leads (four heavy leads and two sense lines).

Step 9. Remove the four Torx T20 screws securing the FEPS to the front of the cabinet.

Figure 3-14Removing the FEPS



Step 10. Grasp the FEPS chassis and remove it from the cabinet

Step 11. Set the failed FEPS chassis aside to be boxed and retuned to the nearest service center.

Replacing the FEPS

Step 1. Place the new FEPS into the appropriate opening in the cabinet and carefully slide it toward the back of the cabinet and align the four studs with the holes in the power busbar.

IMPORTANT Be careful not to butt against the power busbar and risk bending or breaking it.

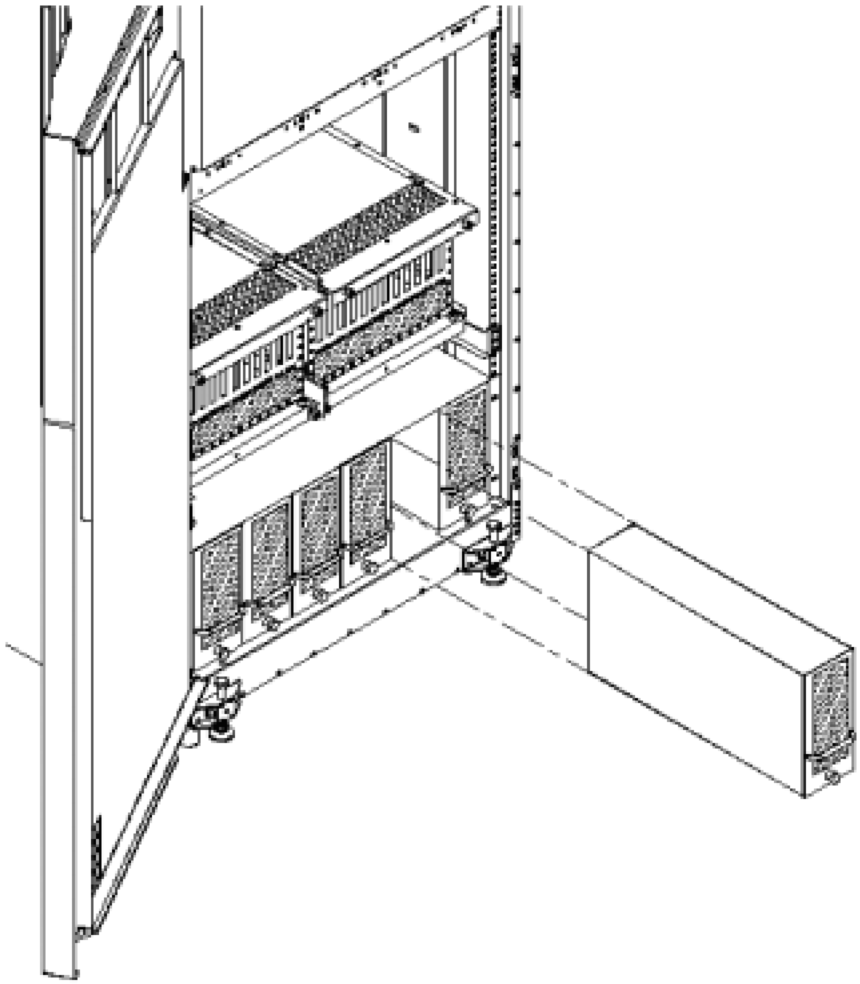
Step 2. Once the studs and holes are aligned correctly, slide the FEPS into the cabinet until its front flanges are flush with the cabinet rack.

Step 3. Secure the new FEPS with four Torx T20 screws. See Figure 3-14 for details.

Step 4. Replace all BPSs.

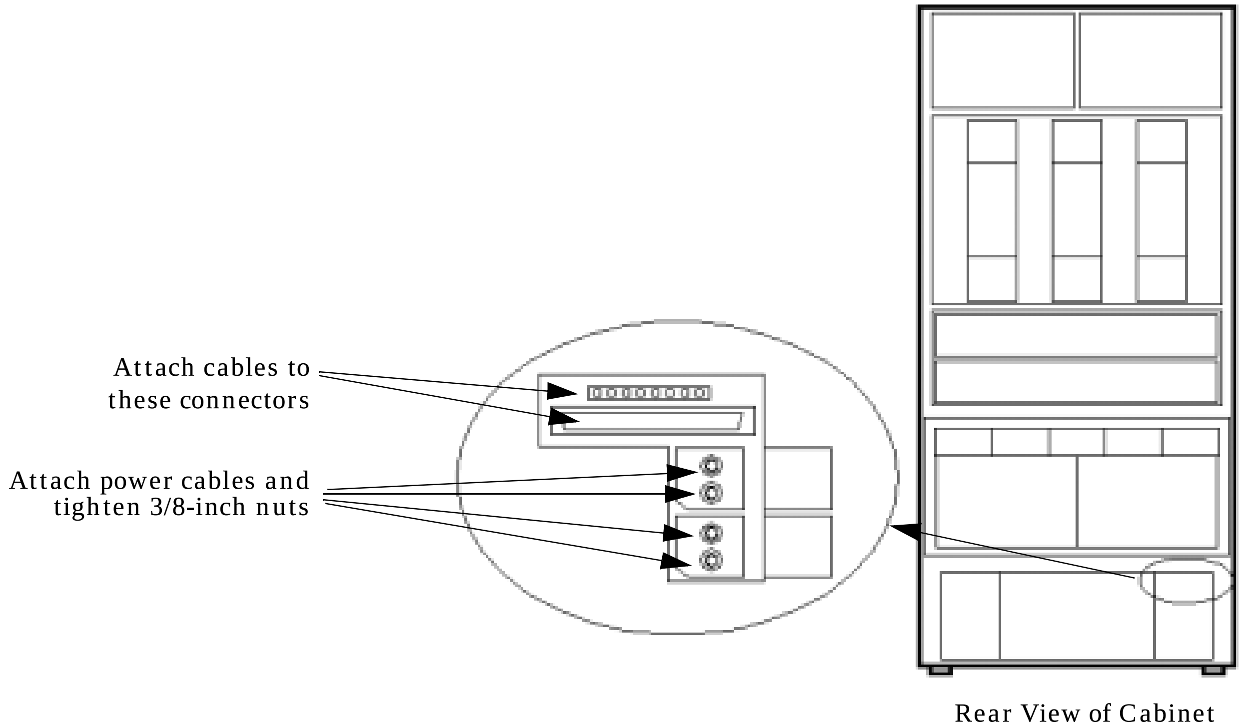
Push the power supply into the FEPS and tighten the single captive thumbscrew in the lower front center portion of the BPS.

Figure 3-15 Removing the BPSs



Step 5. Re-attach the four heavy cables and two sense wires previously marked to the appropriate studs on the FEPS.

Figure 3-16 Re-attaching Power Leads and Cables



Step 6. Slide the PDCA(s) into the FEPS and secure them by tightening the four T15 captive screws on each one.

Step 7. Re-attach the cable groomer and left and right L brackets.

Restoring Power to the Cabinet

Step 1. Turn ON all breakers at the wall panel associated with the cabinet.

Step 2. Power of the housekeeping voltage by turning off the cabinet breakers.

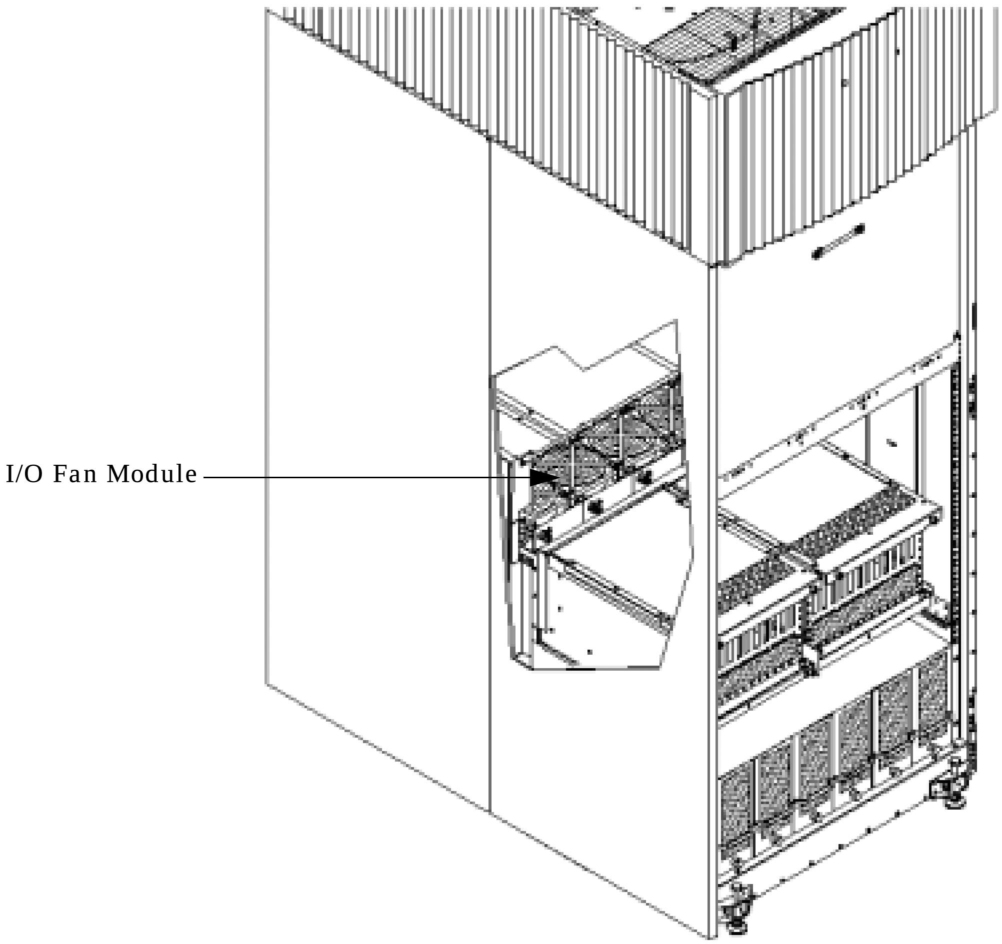
Step 3. Boot all partitions following the procedures in Appendix B, “Powering On and Off the System.”

Removing and Replacing the I/O Fan Module

There are five individual I/O Fan Modules located in the center of each SD32000 cabinet. They are labeled 0 to 4 and are easily replaced from the front of the cabinet. See Figure 3-17.

I/O fan failures are detected by logic on the (UGUY) within the cabinet. A chassis code is generated with error data identifying the type of fan (IO or blower) and its physical location within the cabinet (fan number). This event is relayed to the MP and reflected to all partitions within the complex via their console interface.

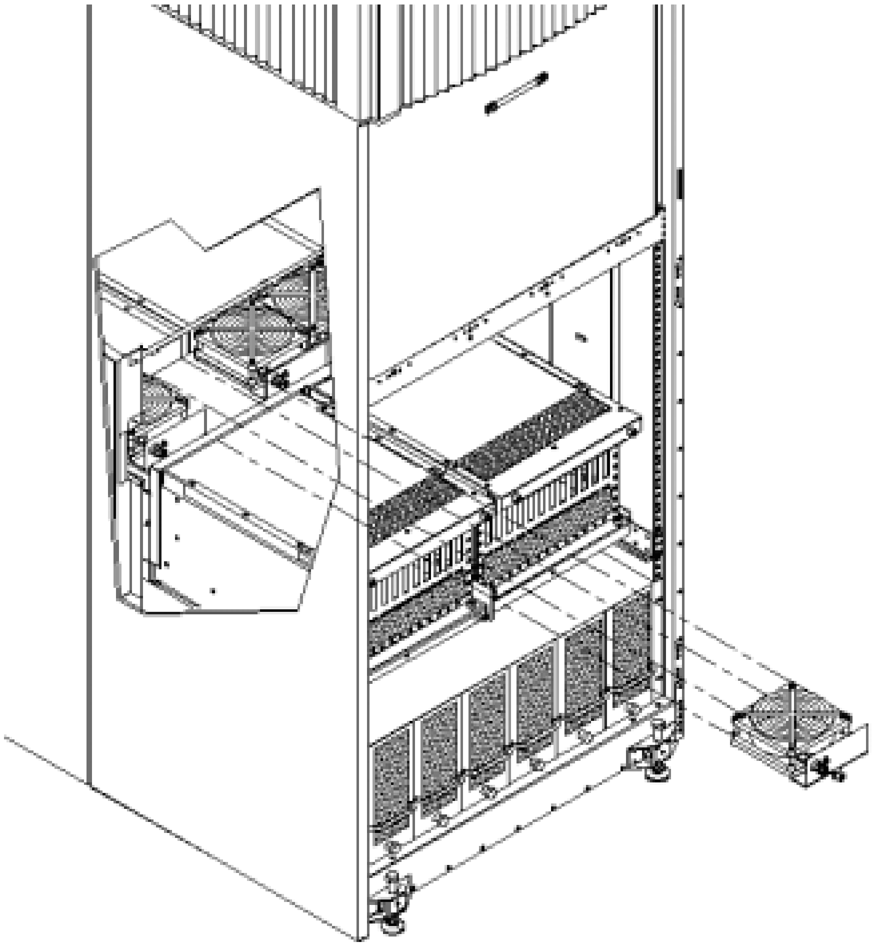
Figure 3-17 I/O Fan Module Location



Removing the I/O Fan Module

This Section contains information on removing an I/O Fan Module

Figure 3-18 I/O Fan Module Detail



Step 1. Locate the failed fan module. The fan modules are numbered 0 to 4 left to right. The failed fan will have the “fan operating” LED off.

Step 2. Loosen the thumbscrew located in the front center of the fan module.

Step 3. Slide the module straight out of the fan mounting frame.

Replacing the I/O Fan Module

Step 1. Slide the replacement fan module into its housing. The electrical connection is via a “blind mate” connector.

Step 2. Tighten the thumbscrew located in the front center of the fan module.

NOTE Take care not to disturb any cable connections on the peripheral component interconnect (PCI-X) card cages when making repairs to the fan modules.

Removing and Replacing the I/O Fan Mounting Frame

The I/O fan mounting frame holds the five I/O fans and is located in the front of the server. The server must be shut down to perform this task.

Removing the I/O Fan Mounting Frame

Step 1. Open the front and rear cabinet doors.

Step 2. Tag and remove all cables from the I/O card cages.

Step 3. Remove all of the I/O card cages or EMI blank panel if present.

Step 4. Remove I/O bay dividers from the front and rear I/O bays.

Step 5. Remove all I/O fans.

Step 6. Loosen the two thumbscrews that secure the front and rear MIOB to the I/O fan mounting frame.

Step 7. Rotate the front and rear MIOBs downward.

Step 8. Loosen the four T-20 captive screws that hold the I/O fan mounting frame in position. There are two screws on the front and two on the rear.

Step 9. Disconnect the I/O OL* LED connectors from the front and rear MIOBS.

Step 10. From the rear, lift the fan mounting frame up and remove from the cabinet. Be careful not to snag any of the cables.

Replacing the I/O Fan Mounting Frame

Step 1. Place the I/O fan mounting frame into position and secure it with four T-20 captive screws.

Step 2. Rotate the front and rear MIOBs upward into position.

Step 3. Secure the front and rear MIOBs to the I/O fan mounting bracket by tightening the two thumbscrews on each.

Step 4. Replace all I/O fans.

Step 5. Replace the I/O bay dividers in the front and rear I/O bays.

Step 6. Replace all of the I/O card cages or EMI blank panel if present.

Step 7. Reconnect all cables to the I/O card cages.

Step 8. Close the front and rear cabinet doors.

Removing and Replacing the Air Filter

SuperDome air filters are located on the inside of the front and rear door assemblies. These filters are easily replaced.

Figure 3-19 Front Air Filter Location

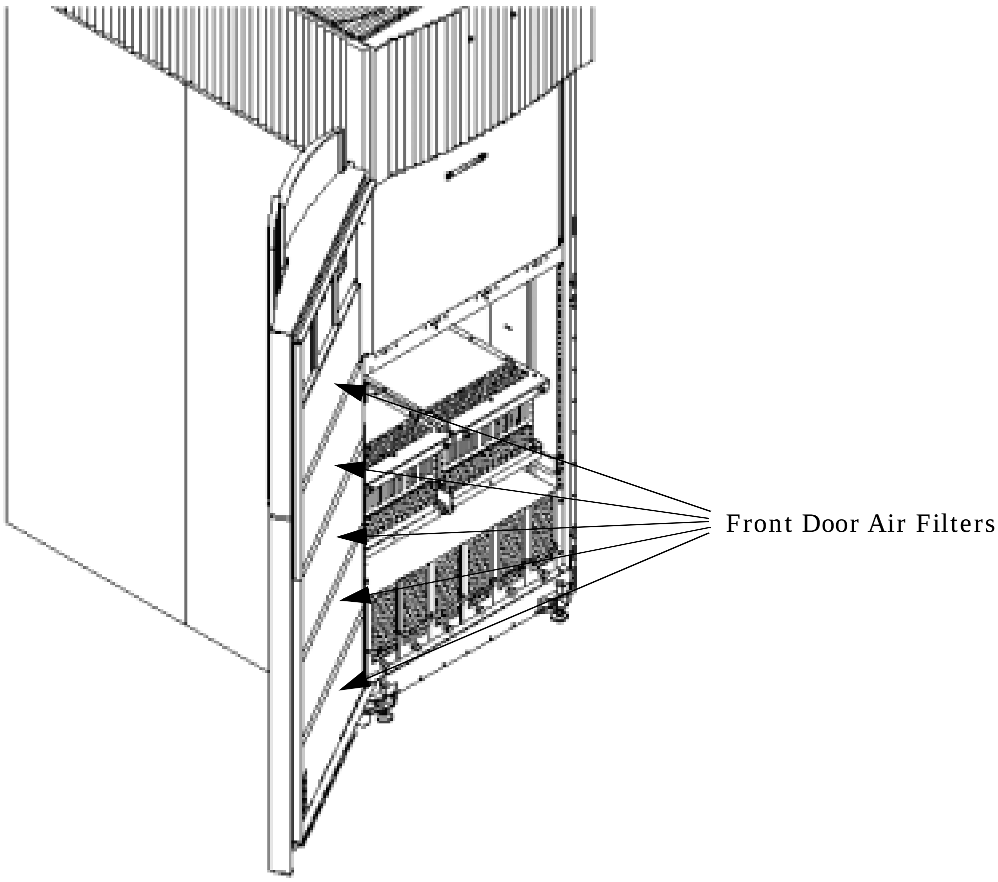
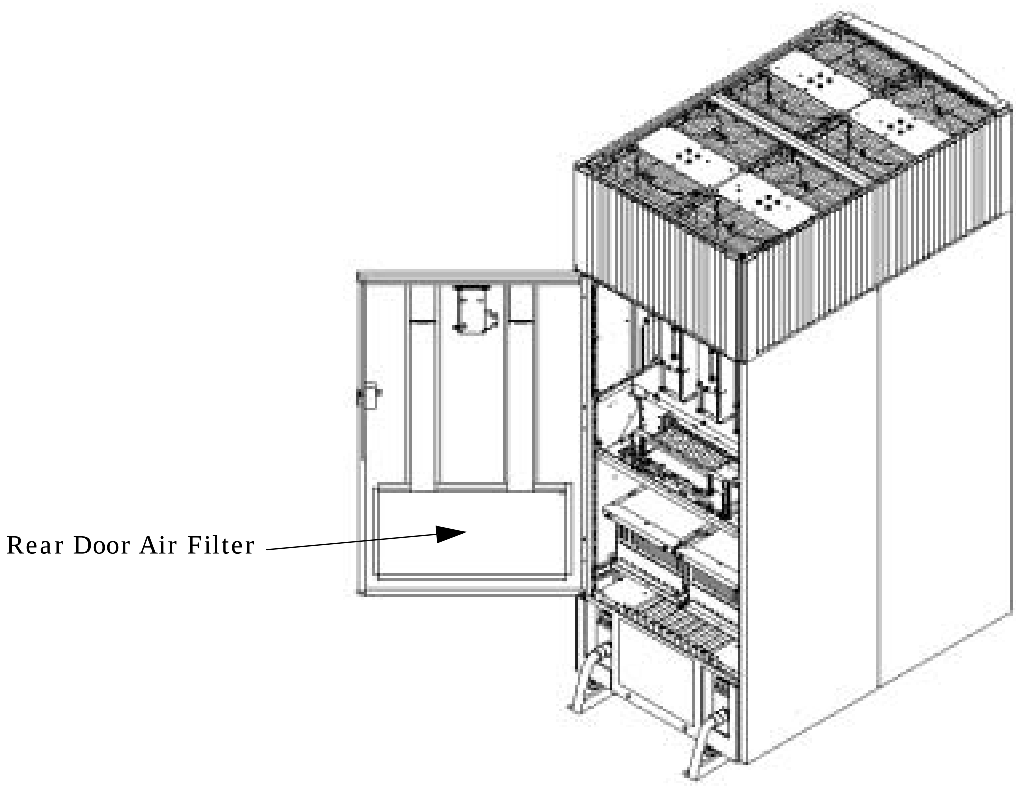


Figure 3-20 Rear Air Filter Location



Removing the Air Filters

Step 1. Remove the filter media from the housing.

Step 2. Using proper ESD procedures, vacuum clean the filter media area.

Replacing the Air Filters

Step 1. Install filter media into the housing.

Step 2. Close the media retainer tightly against the media.

Step 3. Latch media retainer securely.

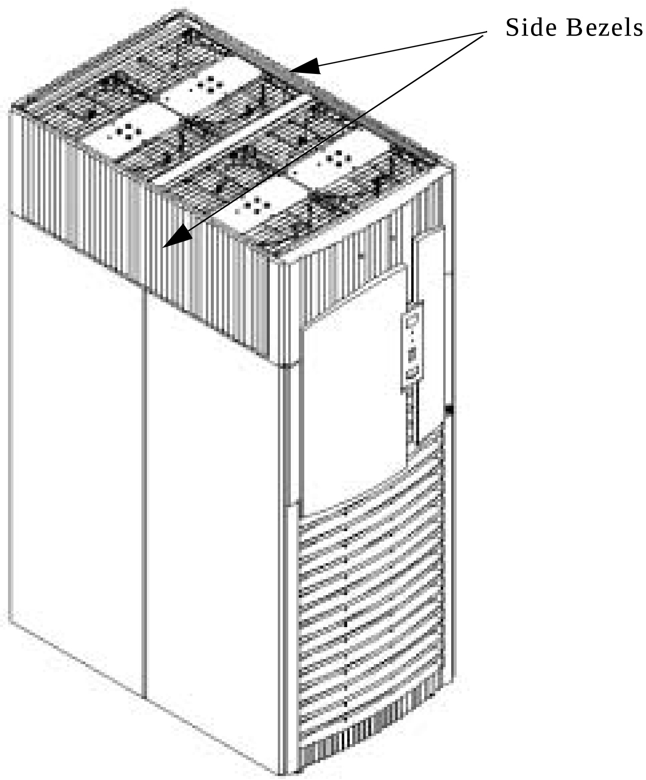
Step 4. Close and latch the front and rear doors.

NOTE Make sure the filter media is flat against the door assembly.

Removing and Replacing the Blower Side Bezels

The cabinet has two blower side bezels. These are cosmetic covers for the blowers and are located on the right and left side of the blower module housing. The blower side bezels are easily replaced.

Figure 3-21 Blower Side Bezel Locations

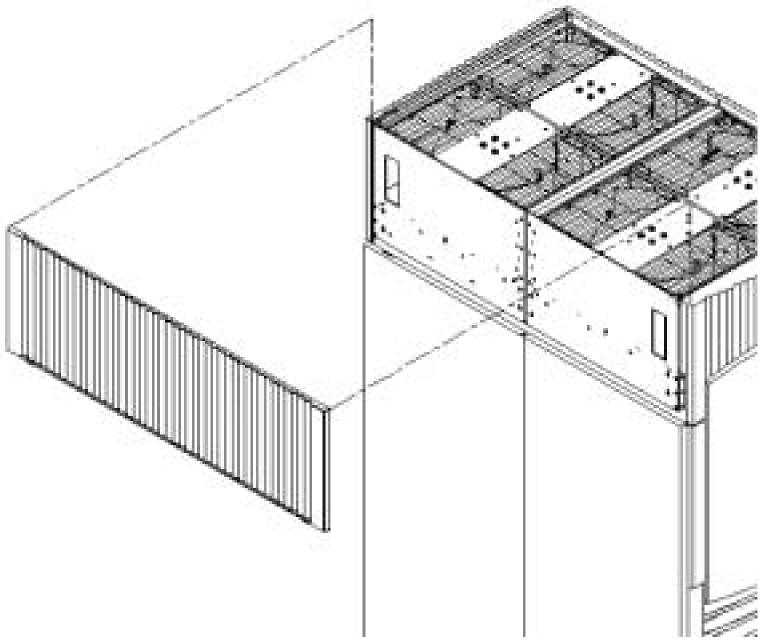


Removing the Blower Side Bezels

The bezel is held on at the top by the bezel lip fitting over the blower housing frame and secured at the bottom by tabs that fit into slots on the cabinet side panels.

The right and left blower side bezels are removed using the same procedure.

Figure 3-22 Blower Side Bezel Detail



Step 1. Remove the front and rear blower bezels.

Step 2. Remove the side blower bezel brackets from front and rear to release the side blower bezel.

Step 3. Lift the bezel up and off the blower housing frame.

Replacing the Blower Side Bezel

The right and left blower side bezels are installed using the same procedure

Step 1. Place the side bezel slightly above the blower housing frame.

Step 2. Align the lower bezel tabs to the slots in the side panels.

Step 3. Lower the bezel so the bezel top lip fits securely on the blower housing frame and the two lower tabs are fully inserted into the side panel slots.

Step 4. Attach the side Blower bezel brackets to the front and rear to secure the bezel in place.

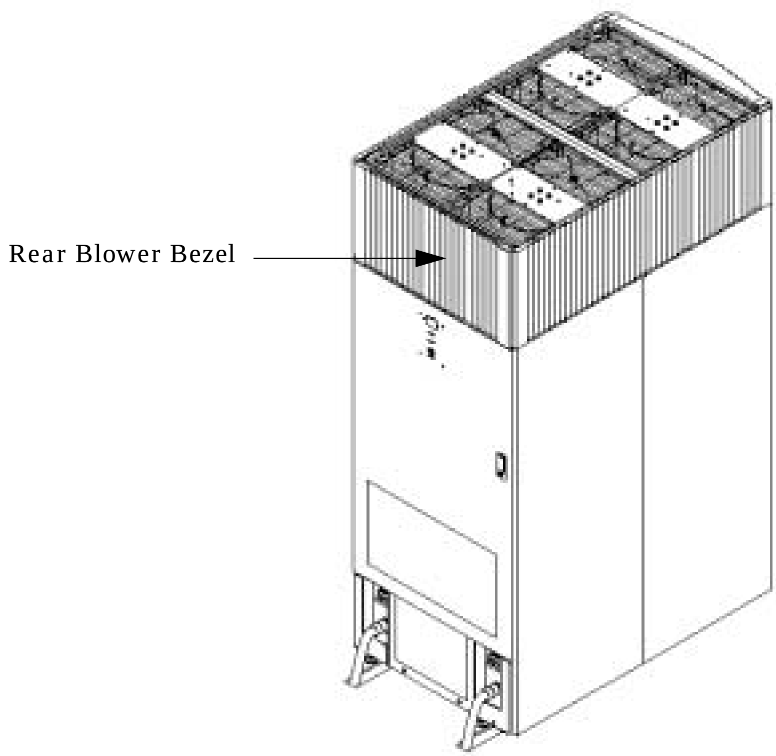
Step 5. Install the front and rear blower bezels.

The front bezel is curved.

Removing and Replacing the Rear Blower Bezel

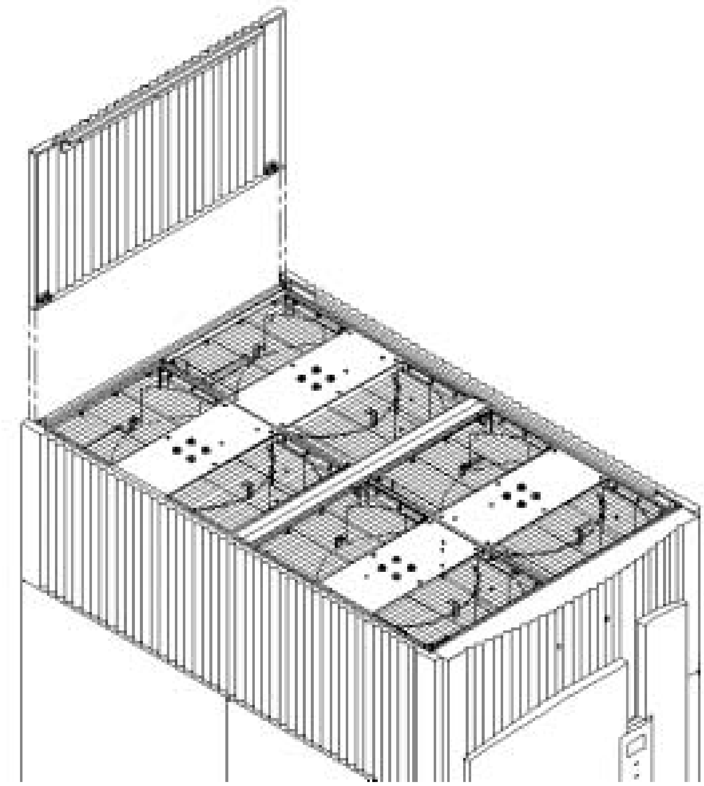
The Rear Blower Bezel is a cosmetic cover for the blowers and is located above the rear door. The Rear Blower bezel is easily replaced.

Figure 3-23 Rear Blower Bezel Location



Removing the Rear Blower Bezel

Figure 3-24 Rear Blower Bezel Detail



Step 1. Loosen the two captive T-20 screws on the lower flange of the bezel.

Step 2. Lift the bezel up and off of the blower housing frame.

Step 3. Place bezel in a location where it will not be damaged.

Replacing the Rear Blower Bezel

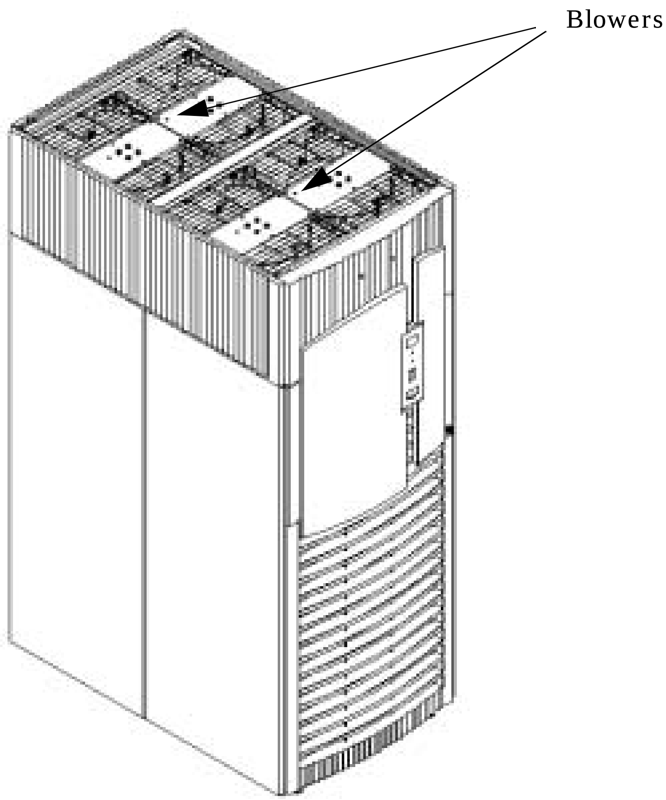
Step 1. Slide the bezel over the blower housing frame, hooking the lip of the bezel onto the cross support of the blower housing.

Step 2. Tighten the two captive screws on the lower flange of the bezel.

Removing and Replacing the Blower Module

SuperDome cabinets have four blower modules located on the top of the cabinet. Blowers 0 and 1 are located in the front of the cabinet and Blowers 2 and 3 are located in the rear. These modules are in an N+1 configuration and may be “hot swapped.”

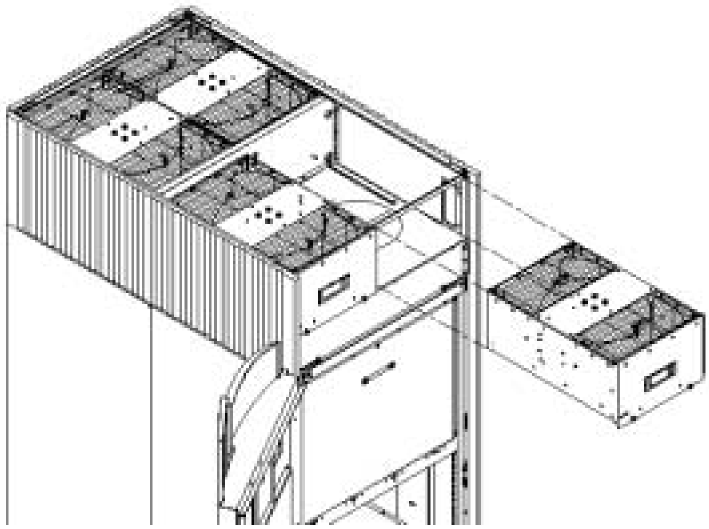
Figure 3-25 Blower Module Location



Removing the Blower Module

This section contains information on removing a blower module.

Figure 3-26 Blower Removal Detail



Step 1. Remove the blower bezel at the front or rear of the server.

Step 2. Notice the blower operating LED status. Confirm that the LED is off.

Step 3. Loosen the two thumbscrews at the bottom of the blower module.

Step 4. Grasp the module by the handle and pull it towards you.

Step 5. Slide the module completely out of the housing and set on a solid surface.

NOTE The blower module is not very heavy, but it is long and bulky.

Replacing the Blower Module

Step 1. Grasp the blower handle while supporting the rear of the blower and insert it into the blower housing.

Step 2. The connectors are “blind mate connectors” with two guide pins. This allows you to simply slide the unit in and tighten the thumbscrews.

Step 3. The fan should start turning when the module is connected.

Step 4. Attach the blower bezel previously removed.

NOTE Be careful not to drop the blower as this will cause misalignment of the metal housing.

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4 System Specifications

The following specifications are based on HP Environmental Class C2. Class C2 is a controlled computer room environment where products are subject only to controlled temperature and humidity extremes. Throughout this chapter each specification is defined as thoroughly as possible to ensure that all data is considered to ensure a successful site preparation and system installation.

Dimensions and Weights

Component Dimensions

Table 4-1 lists the dimensions for the cabinet and components. Table 4-2 list the dimensions for optional IOX cabinets.

Table 4-1 Server Component Dimensions

Component	Width (in. / cm)	Depth (in. / cm)	Height (in. / cm)	Maximum Quantity per Cabinet
Cabinet	30 / 76.2	48 / 121.9	77.2 / 195.6	1
Cell board	16.5 / 41.9	20.0 / 50.2	3.0 / 7.6	8[a]
Cell board power board (OCPB)	16.5 / 41.9	10.125 / 25.7	3.0 / 7.6	8[a]
I/O backplane	11 / 27.9	17.6 / 44.7		1
Master I/O backplane	3.25 / 8.3	23.75 / 60.3	1.5 / 3.8	1
I/O cardcage	12.0 / 30.5	17.5 / 44.4	8.38 / 21.3	4
PDCA	7.5 / 19.0	11.0 / 27.9	9.75 / 24.3	2

a. SD16 is limited to a maximum of 4.

Table 4-2 I/O Expansion Cabinet Component Dimensions

Cabinet Type	Height (in. / cm)	Width (in. / cm)	Depth (in. / cm)
E33	63.5 / 161	23.5 / 59.7	77.3 / 196.0
E41	77.5 / 197	23.5 / 59.7	36.5 / 92.7

Component Weights

Table 4-3 lists the server and component weights.

NOTE Refer to the appropriate documents to determine the weight of the SMS and any console that will be used with this server.

Table 4-3 System Component Weights

Component	Weight Per Unit (lb. / kg)	Quantity	Weight (lb. / kg)
Chassis[a]	745.17 / 338.1	1	745.17 / 338.10
Cell Board w/o Power Board and DIMMs	17.23 / 7.81	8	137.84 / 62.54
Cell Power Board	8.05 / 3.65	8	64.40 / 29.20
DIMMs	0.20 / 0.09	256	51.20 / 23.04
Bulk Power Supply (BPS)	3.83 / 1.74	6	23.00 / 10.44
PDCA	26.00 / 11.80	2	52.00 / 23.59
I/O cardcage	36.50 / 16.56	4	146.00 / 66.24
I/O Cards	0.45 / 0.20	48	21.60 / 9.80
Fully configured server (SD32 cabinet)		1	1241.21 / 563.16[b]

a. The listed weight for a chassis includes the weight of all components not listed in Table 4-3.
b. The listed weight for a fully configured cabinet includes all components and quantities listed in Table 4-3.

Table 4-4 I/O Expansion Cabinet Weights

Component	Weight[a] (lb. / kg)
Fully configured cabinet	1104.9 / 502.2
I/O cardcage	36.50 lbs / 16.56
Chassis	264 lbs / 120

a. The listed weight for a fully configured cabinet includes all items installed in a 1.6 meter cabinet. Add approximately 11 lbs when using a 1.9 meter cabinet.

Shipping Dimensions and Weights

Table 4-5 lists the dimensions and weights of the Support Management Station and a single cabinet with shipping pallet.

Table 4-5 Miscellaneous Dimensions and Weights

Equipment	Width (in. / cm)	Depth/Length (in. / cm)	Height (in. / cm)	Weight (lb. / kg)
System on shipping pallet[a b c]	39.00 / 99.06	48.63 / 123.5	73.25 / 186.7)	1360.8lbs / 618.54)
Blowers/Frame on shipping pallet	40.00 / 101.6	48.00 / 121.9	62.00 / 157.5	99.2 lbs / 45.01
I/O Expansion cabinet on shipping pallet [d]	38.00 / 96.52	48.00 / 121.9	88.25 / 224.1	1115 lbs / 505.8

a. Shipping box, pallet, ramp, and container adds approximately 116 lbs (52.63 kg) to the total system weight.
b. Blowers/Frame are shipped on a separate pallet.
c. Size and number of miscellaneous pallets are determined by the equipment ordered by the customer.
d. Assumes no I/O cards or cables installed. The shipping kit and pallet and all I/O cards adds approximately 209 lbs to the total weight.

Electrical Specifications

The following specifications are based on HP Environmental Class C2. Class C2 is a controlled computer room environment where products are subject only to controlled temperature and humidity extremes. Throughout this chapter each specification is defined as thoroughly as possible to ensure that all data is considered to ensure a successful site preparation and system installation.

Grounding

The site building shall provide a safety ground/protective earth for each AC service entrance to all cabinets.

This equipment is CLASS 1 and requires full implementation of the grounding scheme to all equipment connections. Failure to attach Protective Earth results in loss of regulatory compliance and creates a possible safety hazard.

Circuit Breaker

Each cabinet using a three-phase, four-wire input requires dedicated circuit breaker to support the Marked Electrical current of 44A per phase. The facility electrician and local service codes will determine proper circuit breaker selection.

Each cabinet using a three-phase five-wire input requires a dedicated circuit breaker to support the Marked Electrical current of 24A per phase. The facility electrician and local service codes will determine proper circuit breaker selection.

NOTE When using the minimum sized breaker, always choose circuit breakers with the maximum allowed trip delay to avoid nuisance tripping.

Power Options

Table 4-6 describes the available power options. It may be unusual to list Options 6 and 7 and not 1 and 2. The options listed are consistent with previous options for earlier Superdome systems.

Table 4-6 Available Power Options

Option	Source Type	Source Voltage (nominal)	PDCA Required	Input Current Per Phase 200-240 VAC [a]	Power Receptacle Required
6	3-phase	Voltage range 200-240 VAC, phase-to-phase, 50 Hz / 60 Hz	four-wire	44A Maximum per phase	Connector and plug provided with a 2.5-meter power cable. Electrician must hard-wire receptacle to 60A site power.
7	3-phase	Voltage range 200-240 VAC, phase-to-neutral, 50 Hz / 60 Hz	five-wire	24A Maximum per phase	Connector and plug provided with a 2.5-meter power cable. Electrician must hard-wire receptacle to 32A site power.

a. A dedicated branch circuit is required for each PDCA installed.

Table 4-7 Option 6 and 7 Specifics

PDCA Part Number	Attached Power Cord	Attached Plug	Receptacle Required
A5201-69023 (Option 6)	OLFLEX 190 (PN 600804) is a 2.5 meter multi conductor, 600 volt, 90 degree C, UL and CSA approved, oil resistant flexible cable. (8 AWG 60 A capacity)	Mennekes ME 460P9 (60 A capacity)	Mennekes ME 460R9 (60 A capacity)
A5201-69024 (Option 7)	H07RN-F (OLFLEX PN 1600130) is a 2.5 meter heavy duty neoprene jacketed harmonized European flexible cable. (4 mm^2 32A capacity)	Mennekes ME 532P6-14 (32A capacity)	Mennekes ME 532R6-1500 (32 A capacity)

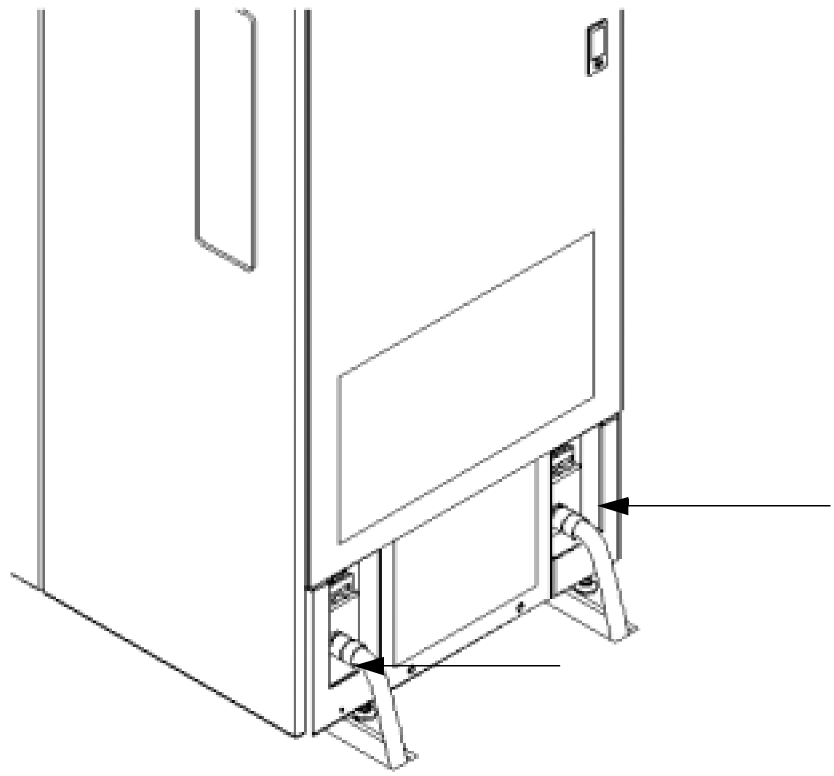
NOTE A qualified electrician must wire the PDCA receptacle to site power using copper wire and in compliance with all local codes.

Each branch circuit used within a complex must be connected together to form a common ground.

When only one PDCA is to be installed in a system cabinet, it must be installed as PDCA0. Refer to Figure 4-1 for PDCA0 location.

NOTE When wiring a PDCA, phase rotation is unimportant. When using two PDCAs, however, the rotation must be consistent for both.

Figure 4-1 PDCA Locations



System Power Requirements

Table 4-8 and Table 4-9 list the AC power requirements for a hp Integrity Superdome and hp 9000 Superdome systems. These tables provide information to help determine the amount of AC power needed for your computer room.

Table 4-8 Power Requirements (without Support Management Station)

Requirements	Value	Comments
Nominal input voltage	200/208/220/230/240 (VAC rms)	
Input voltage range (minimum - maximum)	200 - 240 (VAC rms)	Autoselecting (measured at input terminals)
Frequency range (minimum - maximum)	50/60 (Hz)	
Number of phases	3	
Maximum inrush current	90 (A peak)	
Product Label maximum current, three-phase, four-wire	44 (A rms)	Per phase at 200-240VAC

Table 4-8 Power Requirements (without Support Management Station)

Requirements	Value	Comments
Product Label maximum current, three-phase, five-wire	24 (A rms)	Per phase at 200-240VAC
Power factor correction	0.95 minimum	
Ground leakage current (mA)	> 3.5 ma	See WARNING below.

WARNING **Beware of shock hazard. When connecting or removing input power wiring, always connect the ground wire first and disconnect it wire last.**

Component Power Requirements

Table 4-8 and Table 4-9 list the AC power requirements for a hp Integrity Superdome and hp 9000 Superdome systems. These tables provide information to help determine the amount of AC power needed for your computer room.

Table 4-9 Component Power Requirements (without Support Management Station)

Power Required 50Hz or 60 Hz[a]	VA
Maximum configuration for SD16	8,200
Maximum configuration for SD32	12,196
Cell Board	900
I/O Cardcage	500

a. A number that should be used for planning to allow for enough power to upgrade through the life of the system.

I/O Expansion Cabinet Power Requirements

The I/O expansion cabinet requires a single phase 200-240VAC input. Table 4-10 lists the AC power requirements for the I/O expansion cabinet.

NOTE The IOX accommodates two AC inputs for redundancy

Table 4-10 I/O Expansion Cabinet Power Requirements (without Support Management Station)

Requirements	Value
Nominal input voltage	200/208/220/230/240 (VAC rms)
Input voltage range (minimum-maximum)	200-240 (VAC rms)
Frequency range (minimum-maximum)	50/60 (Hz)
Number of phases	1
Marked Electrical input current	16A
Maximum inrush current	60 max (A peak)
Power factor correction	0.95 minimum

Table 4-11 I/O Expansion Cabinet Component Power Requirements

Power Required (50 - 60 Hz)	VA
Fully configured cabinet	3200
I/O cardcage	500
ICE	600

I/O Expansion Cabinet Power Cords

Table 4-12 lists the power cords for the I/O expansion cabinet.

Table 4-12 I/O Expansion Cabinet AC Power Cords

Part Number A5499AZ	Where Used	Connector Type
-001	North America	L6-20
-002	International	IEC 309

Environmental Requirements

This section provides the environmental, power dissipation, noise emission, and air flow specifications.

Temperature and Humidity Specifications

Table 4-13 Controlled Computer Room Environment Specifications

Temperature (dry bulb °C)[a]		Relative Humidity %; Noncondensing		Dew Point[b]	Rate of Chg (°C/hr, max)
Allowable[c,d]	Recommended[e]	Allowable[d]	Recommended[e]		
15 - 32 (59° to 90° F)	20 - 25 (68° to 77° F)	20 - 80	40 - 55	17	5

a. Dry bulb temperature is the regular ambient temperature. Derate maximum dry bulb temperature 1°C/300 m above 900 m.
b. Must be noncondensing environment.
c. With installed media, the minimum temperature is 10°C and maximum relative humidity is limited to 80%. Specific media requirements may vary.
d. Allowable: equipment design extremes as measured at the equipment inlet.
e. Recommended: target facility design and operational range.

Table 4-14 Power-Off Storage and Shipping Requirements

Storage			Powered Off (installed)		
Temp (°C, dry bulb - regular ambient temp.)	Rel Hum %; Non-condensing	Dew point (max)	Temp (°C, dry bulb - regular ambient temp.)	Rel Hum %; Non-condensing	Dew point (max)
-40 - 60	8 - 90	32	5 - 45	8 - 90	29

Power Dissipation

Table 4-15 and Table 4-16 show the power requirements by configuration (i.e. number of cell boards, amount of memory per cell, and number of I/O chassis) for the hp Integrity Superdome and the hp 9000 Superdome, respectively.

There are two columns of power numbers (Watts). The Power Breaker column shows the power used to size the wall breaker at the installation site. The Typical Power column shows typical power. Typical power numbers may be used to assess average utility cost of cooling and electrical power. These tables also show the recommended breaker sizes for 4-wire and 5-wire sources

Table 4-15 Typical hp Integrity Superdome Configurations

Cell	Memory	IO	Typical (Watts)	Cooling (BTU/Hr.)	Breaker Power (Watts)[a]	3-Pole Breaker Size (Amperes)[a,b]	4-Pole Breaker Size (Amperes)[a,c,d]
8	32	4	9790	33406	12335	40	25
8	16	2	8450	28834	10647	40	25
8	8	4	8680	29619	10937	40	25
8	8	2	8170	27878	10294	35	20
8	4	4	8400	28663	10584	35	20
8	4	2	7700	26275	9702	35	20
6	16	4	7370	25149	9286	35	20
6	16	2	6660	22726	8392	30	20
6	8	4	7010	23920	8833	30	20
6	8	2	6300	21497	7938	30	20
6	4	4	6800	23204	8568	30	20
6	4	2	6100	20815	7686	30	20
4	16	4	5880	20064	7409	30	20
4	16	2	5170	17642	6514	30	20
4	8	4	5340	18222	6728	30	20
4	8	2	4630	15799	5834	25	20
4	4	4	5200	17744	6552	25	20
4	4	2	4500	15355	5670	25	20
2	16	2	3800	12967	4788	20	20
2	8	2	3500	11943	4410	20	20
2	4	2	3400	11602	4284	20	20

a. These numbers are valid only for the specific configurations shown. Any upgrades may require a change to the breaker size. A 5-wire source utilizes a 4 pole breaker and a 4-wire source utilizes a 3 pole breaker. *The PE (Protective Earth) ground wire is not switched.*

b. An input power source supplied from a 3-pole plus protective earth (PE), 4-wire system will always be wired as 240 volts phase-to-phase, no neutral or common, plus a PE ground. Three phase input voltage (240VAC) to the equipment is connected phase-to-phase. Examples of 4 wire: 200-volt phase-to-phase, 208-volt phase-to-phase, 220-volt phase-to-phase, 230-volt phase-to-phase, 240-volt phase-to-phase.

c. An input power source supplied from a three-pole plus PE, four-wire system may be wired as either:

200VAC phase-to-phase, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-phase. The neutral terminal in the PDCA is not connected.
208VAC phase-to-phase, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-phase. The neutral terminal in the PDCA is not connected.
220VAC phase-to-phase, plus a PE ground, plus a PE ground. Three phase input voltage to the equipment is connected phase-to-phase. The neutral terminal in the PDCA is not connected.
230VAC phase-to-phase, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-phase. The neutral terminal in the PDCA is not connected.
240VAC phase-to-phase, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-phase. The neutral terminal in the PDCA is not connected.

d. An input power source supplied from a four-pole plus neutral plus PE, five-wire system may be wired as either:

200VAC phase-to-neutral, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.
208VAC phase-to-neutral, with a neutral return, plus a PE ground. Three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.
220VAC phase-to-neutral, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.
230VAC phase-to-neutral, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.
240VAC phase-to-neutral, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.
415VAC phase-to-neutral, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.

Do not connect a 380 to 415VAC supply to a four-wire PDCA. This is a safety hazard and will result in damage to the product. Line-to-line or phase-to-phase voltage measured at 380 to 415VAC must always be connected using a 5-wire PDCA.

Table 4-16 Typical hp 9000 Superdome Configurations

Cell	Memory	IO	Typical (Watts)	Cooling (BTU/Hr.)	Breaker Power (Watts)[a]	3-Pole Breaker Size (Amperes)[a,b]	4-Pole Breaker Size (Amperes)[a,c,d]
8	32	4	9038	30840	11388	40	25
8	16	2	7698	26268	9699	40	25
8	8	4	7928	27053	9989	40	25
8	8	2	7418	25312	9347	35	20
8	4	4	7648	26097	9636	35	20
8	4	2	6948	23709	8754	35	20
6	16	4	6806	23224	8576	35	20
6	16	2	6096	20801	7681	30	20
6	8	4	6446	21996	8122	30	20
6	8	2	5736	19573	7227	30	20
6	4	4	6236	21279	7857	30	20
6	4	2	5536	18890	6975	30	20
4	16	4	5504	18781	6935	30	20
4	16	2	4794	16359	6040	30	20
4	8	4	4964	16939	6255	30	20
4	8	2	4254	14516	5360	25	20
4	4	4	4824	16461	6078	25	20
4	4	2	4124	14072	5196	25	20
2	16	2	3612	12325	4551	20	20
2	8	2	3312	11302	4173	20	20
2	4	2	3212	10960	4047	20	20

a. These numbers are valid only for the specific configurations shown. Any upgrades may require a change to the breaker size. A 5-wire source utilizes a 4 pole breaker and a 4-wire source utilizes a 3 pole breaker. *The PE (Protective Earth) ground wire is not switched.*

b. An input power source supplied from a 3-pole plus protective earth (PE), 4-wire system will always be wired as 240 volts phase-to-phase, no neutral or common, plus a PE ground. Three phase input voltage (240VAC) to the equipment is connected phase-to-phase. Examples of 4 wire: 200-volt phase-to-phase, 208-volt phase-to-phase, 220-volt phase-to-phase, 230-volt phase-to-phase, 240-volt phase-to-phase.

c. An input power source supplied from a three-pole plus PE, four-wire system may be wired as either:

200VAC phase-to-phase, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-phase. The neutral terminal in the PDCA is not connected.
208VAC phase-to-phase, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-phase. The neutral terminal in the PDCA is not connected.
220VAC phase-to-phase, plus a PE ground, plus a PE ground. Three phase input voltage to the equipment is connected phase-to-phase. The neutral terminal in the PDCA is not connected.
230VAC phase-to-phase, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-phase. The neutral terminal in the PDCA is not connected.
240VAC phase-to-phase, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-phase. The neutral terminal in the PDCA is not connected.

d. An input power source supplied from a four-pole plus neutral plus PE, five-wire system may be wired as either:

200VAC phase-to-neutral, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.
208VAC phase-to-neutral, with a neutral return, plus a PE ground. Three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.
220VAC phase-to-neutral, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.
230VAC phase-to-neutral, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.
240VAC phase-to-neutral, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.
415VAC phase-to-neutral, plus a PE ground. The three phase input voltage to the equipment is connected phase-to-neutral. The neutral wire is connected to the PDCA neutral terminal.

Do not connect a 380 to 415VAC supply to a four-wire PDCA. This is a safety hazard and will result in damage to the product. Line-to-line or phase-to-phase voltage measured at 380 to 415VAC must always be connected using a 5-wire PDCA.

Acoustic Noise Specification

The acoustic noise specifications are as follows:

- 8.2 bel (sound power level)
- 65.1 dBA (sound pressure level at operator position)

The above levels are appropriate for dedicated computer room environments, not office environments.

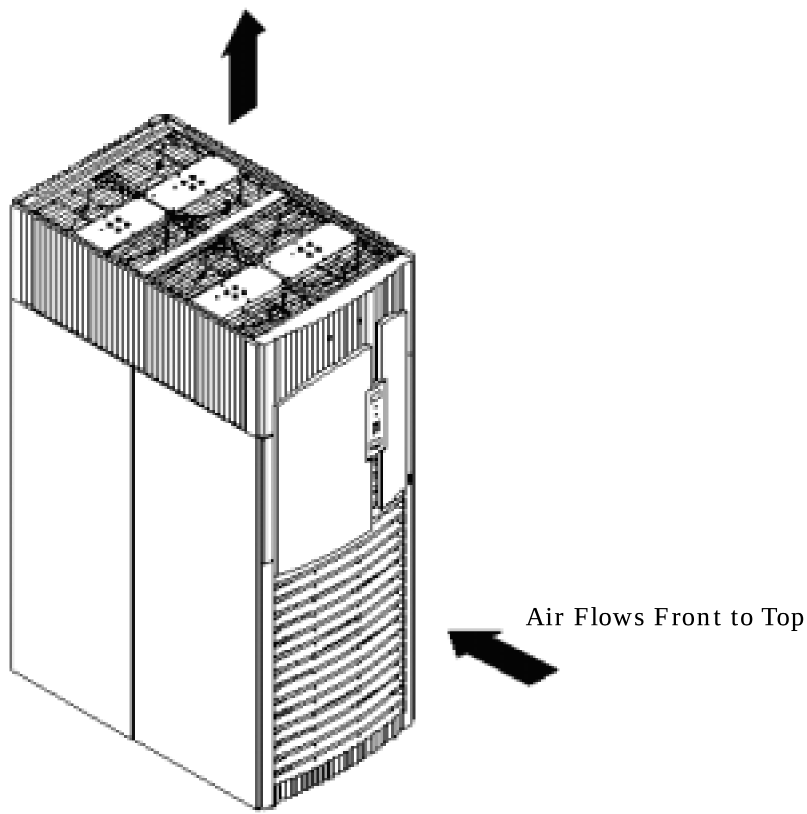
Care should be taken to understand the acoustic noise specifications relative to operator positions within the computer room or when adding hp Integrity Superdome or hp 9000 Superdome systems to computer rooms with existing noise sources.

Air Flow

hp Integrity Superdome or hp 9000 Superdome systems require the cabinet air intake temperature to be between 20^{o} C and 30^{o} C at 2400 CFM. Any cooling system layouts described in Chapter 2 can be adapted to cool the system.

Figure 4-2 on page 130 illustrates the location of the inlet and outlet airducts on a single cabinet.

Figure 4-2 Airflow Diagram



5 Site Preparation

Electrical and Environmental Guidelines

Electrical Factors

Proper design and installation of a power distribution system for a server requires specialized skills. Those responsible for this task must have a thorough knowledge and understanding of appropriate electrical codes and the limitations of the power systems for computer and data processing equipment.

In general, a well-designed power distribution system exceeds the requirements of most electrical codes. A good design, when coupled with proper installation practices, produces the most trouble-free operation.

A detailed discussion of power distribution system design and installation is beyond the scope of this document. However, electrical factors relating to power distribution system design and installation must be considered during the site preparation process.

The electrical factors discussed in this section are:

- Computer room safety
- Electrical load requirements (circuit breaker sizing)
- Power quality
- Distribution hardware
- System installation guidelines

Computer Room Safety

Inside the computer room, fire protection and adequate lighting (for equipment servicing) are important safety considerations. Federal and local safety codes govern computer installations.

Fire Protection The National Fire Protection Association's Standard for the Protection of Electronic Computer Data Processing Equipment, NFPA 75, contains information on safety monitoring equipment for computer rooms.

Most computer room installations are equipped with the following fire protection devices:

- Smoke detectors
- Fire and temperature alarms
- Fire extinguishing system

Additional safety devices are:

- Circuit breakers
- An emergency power cutoff switch
- Devices specific to the geographic location, i.e., earthquake protection

Lighting Requirements for Equipment Servicing Adequate lighting and utility outlets in a computer room reduce the possibility of accidents during equipment servicing. Safer servicing is also more efficient and, therefore, less costly.

For example, it is difficult to see cable connection points on the hardware if there is not enough light. Adequate lighting reduces the chances of connector damage when cables are installed or removed.

The minimum recommended illumination level is 70 foot-candles (756 lumens per square meter) when the light level is measured at 30 inches (76.2 cm) above the floor.

Power Quality

This equipment is designed to operate over a wide range of voltages and frequencies. It has been tested and shown to comply with EMC Specification EN50082. However, damage can occur if these ranges are exceeded. Severe electrical disturbances can exceed the design specifications of the equipment.

Sources of Electrical Disturbances Electrical disturbances, glitches, affect the quality of electrical power. Common sources of these disturbances are:

- Fluctuations occurring within the facility's distribution system
- Utility service low-voltage conditions (such as sags or brownouts)
- Wide and rapid variations in input voltage levels
- Wide and rapid variations in input power frequency
- Electrical storms
- Large inductive sources (such as motors and welders)
- Faults in the distribution system wiring (such as loose connections)
- Microwave, radar, radio, or cell phone transmissions

Power System Protection Computer systems can be protected from the sources of many of these electrical disturbances by using:

- A Protective Earth (PE) connection with a wire diameter of at least equal to the current carrying conductors. The neutral conductor must not be used for the PE connection. (The PE wire is GREEN with a YELLOW stripe.)
- A dedicated power distribution system
- Power conditioning equipment
- Over- and under-voltage detection and protection circuits
- Screening to cancel out the effects of undesirable transmissions
- Lightning arresters on power cables to protect equipment against electrical storms

Every precaution has been taken during power distribution system design to provide immunity to power outages of less than one cycle. However, testing cannot conclusively rule out loss of service. Therefore, adherence to the following guidelines provides the best possible performance of power distribution systems for server equipment:

- Dedicated power source—Isolates server power distribution system from other circuits in the facility.
- Missing-phase and low-voltage detectors—Shuts equipment down automatically when a severe power disruption occurs. For peripheral equipment, these devices are recommended but optional.
- Online uninterruptable power supply (UPS)—Keeps input voltage to devices constant and should be considered if outages of one-half cycle or more are common. Refer to qualified contractors or consultants for each situation.

Distribution Hardware

This section describes wire selection and the types of raceways (electrical conduits) used in the distribution system. Wire size is dictated by circuit breaker sizing and local safety codes.

Wire Selection Use copper conductors instead of aluminum, as aluminum's coefficient of expansion differs significantly from that of other metals used in power hardware. Because of this difference, aluminum conductors can cause connector hardware to work loose, overheat, and fail.

Raceway Systems (Electrical Conduits) Raceways (electrical conduits) form part of the protective ground path for personnel and equipment. Raceways protect the wiring from accidental damage and also provide a heat sink for the wires.

Any of the following types may be used:

- Electrical metallic tubing (EMT) thin-wall tubing
- Rigid (metal) conduit
- Liquidtight with RFI strain relief (most commonly used with raised floors)
- Plenum-grade cables

Building Distribution All building feeders and branch circuitry should be in rigid metallic conduit with proper connectors (to provide ground continuity). Conduit that is exposed and subject to damage should be constructed of rigid galvanized steel.

The IOX and hp Integrity Superdome or hp 9000 Superdome are safety grounded through the green/yellow (ground) wire in each AC power cord. In the IOX, this ground passes through the AC power cord entry into the XPC and connects internally to the XPC chassis. The XUC chassis and each ICE chassis are grounded through their respective DC power cords from the XPC. Additional safety grounding must be provided for networking equipment.

Power Routing Power drops and interface cables from the equipment are routed down from the power panel, through a grommet-protected opening (beneath the floor level), and under the floor panels.

Grounding Systems

Superdome servers require two methods of grounding:

- Power distribution safety grounding
- High frequency intercabinet grounding

Power Distribution Safety Grounding The power distribution safety grounding system consists of connecting various points in the power distribution system to earth ground using green (green/yellow) wire ground conductors. Having these ground connections tied to metal chassis parts that may be touched protects computer room personnel against shock hazard from current leakage and fault conditions.

Power distribution systems consist of several parts. Hewlett-Packard recommends that these parts be solidly interconnected to provide an equipotential ground to all points.

Main Building Electrical Ground The main electrical service entrance equipment should have an earth ground connection, as required by applicable codes. Connections such as a grounding rod, building steel, or a conductive type cold water service pipe provide an earth ground.

Electrical Conduit Ground To provide a continuous grounding system, all electrical conduits should be made of rigid metallic conduit that is securely connected together or bonded to panels and electrical boxes.

Power Panel Ground Each power panel should be grounded to the electrical service entrance with green (green/yellow) wire ground conductors. The green (green/yellow) wire ground conductors should be sized per applicable codes (based on circuit over current device ratings).

NOTE The green wire ground conductor mentioned above may be a black wire marked with green tape.

Computer Safety Ground Ground all computer equipment with the green (green/yellow) wire included in the branch circuitry. The green (green/yellow) wire ground conductors should be connected to the appropriate power panel and should be sized per applicable codes (based on circuit over current device ratings).

Superdome was approved by regulatory agencies around the world, and therefore requires a ground/protective earth. there are no exclusions to this regulatory approval.

High-frequency grounding between IOX and Superdome is provided by the cabinet-to-cabinet signal cabling. Whenever an IOX is connected to a Superdome cabinet, low-frequency grounding between these two cabinets is provided by a ground strap. This ground strap is shipped with each IOX. Refer to the *I/O Expansion Cabinet Guide* for more detail.

Newtwork-connected Equipment Ground The installation must provide a ground connection for the network equipment. This statement is translated into the following two languages as required:

WARNING **Sweden: Apparaten skall anslutas till jordat uttag, när den ansluts till ett nätverk.**

WARNING **Denmark: Før tilslutning af de øvrige ledere, se medfølgende installationsvejledning.**

Raised Flooring, Signal Reference Grids, and High Frequency Grounding

If a raised floor system is used, install a complete signal reference grid (SRG) for maintaining equal potential over a broad range of frequencies. The grid should be connected to power source X0 and cabinet grounds as well as to other electrical service grounds. Flat braid offers superior frequency controls to round wire. Figure 5-1 on page 136 illustrates a metallic strip grounding system.

NOTE Regardless of the grounding connection method used, the raised floor should be grounded as an absolute safety minimum. For more information regarding raised computer floors, see NEC section 645-15.

HP recommends the following approaches:

- Excellent—Add a grounding grid to the subfloor. The grounding grid should be made of flat braid copper strips in a 2 ft. by 2 ft. manner mounted to the subfloor. The strips should be 0.032 in. (0.08 cm) thick and a minimum of 3.0 in. (8.0 cm) wide. Connect each pedestal to four strips using 1/4-in (6.0-mm) bolts tightened to the manufacturer's torque recommendation.
- Better—A grounded #6 or #4 AWG 2 ft. by 2 ft. copper wire grid mechanically clamped to floor pedestals and properly bonded to the building or site ground.
- Good—Use the raised floor structure as a ground grid. In this case, the floor must be designed as a ground grid with bolted down stringers and corrosion resistive plating (to provide low resistance and attachment points for connection to service entrance ground and HP computer equipment). The use of conductive floor tiles with this style of grid further enhances ground performance.

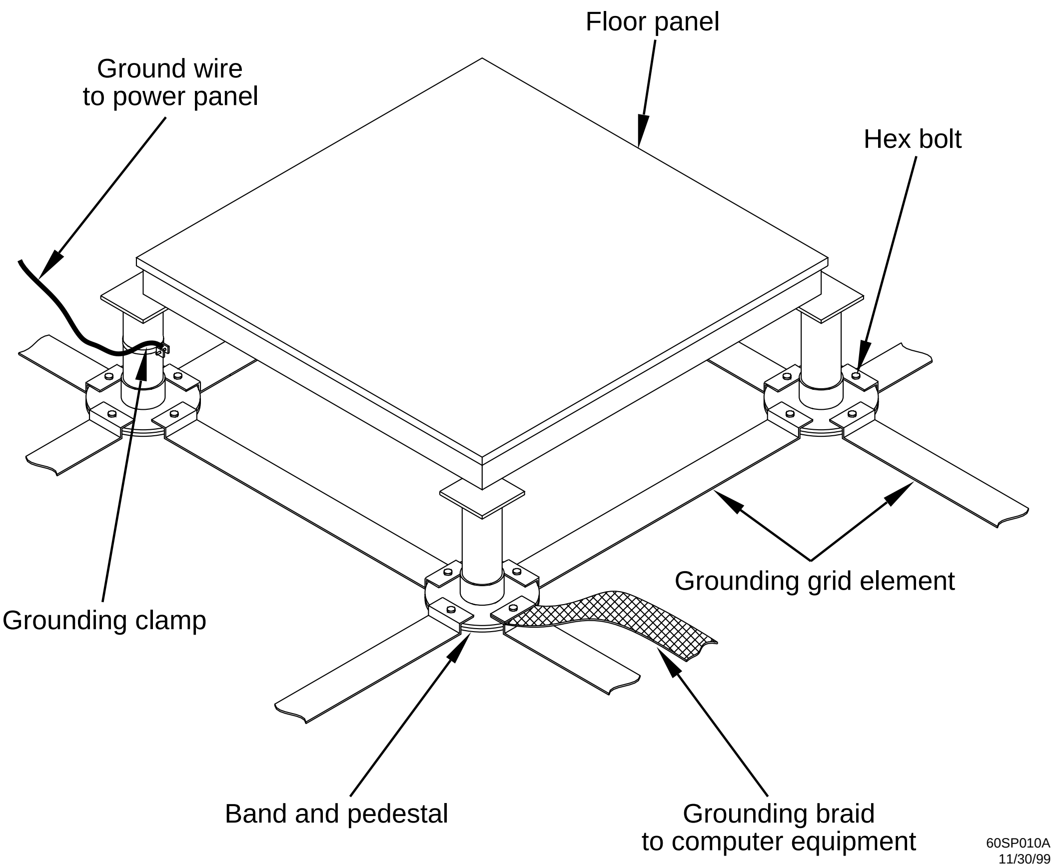
NOTE The structure needs to meet all applicable safety codes and be mechanically bonded to known good grounding points.

Best Practices

- Use a 2ft by 2ft grid.
- Flat braid is preferred over round wire.
- Exothermic welds are preferred over mechanical connections.
- All transformers mounted on the floor should have an X0 bond to floor.
- All air conditioning cabinets mounted on the floor with a bonding connection to the floor.
- A vertical building steel grounding point is preferred over long wire runs to electrical service entrance.
- Very short straps to the floor are preferred over excess lengths.

HP recommendations concerning the proper grounding of a raised floor or signal reference grid are closely aligned with other agencies such as the NEC and IEEE.

Figure 5-1 Raised Floor Metal Strip Ground System



System Installation Guidelines

This section contains information about installation practices. Some common pitfalls are highlighted. Both power cable and data communications cable installations are discussed.

Wiring Connections Expansion and contraction rates vary among different metals. Therefore, the integrity of an electrical connection depends on the restraining force applied. Connections that are too tight compress or deform the hardware and causes it to weaken. This usually leads to high impedance causing circuit breakers to trip.

CAUTION Connections that are too loose have a high resistance that cause serious problems, such as erratic equipment operation. A high resistance connection overheats and sometimes causes fire or high temperatures that can destroy hard-to-replace components such as distribution panels or system bus bars.

Wiring connections must be properly torqued. Many equipment manufacturers specify the proper connection torque values for their hardware.

Ground connections must only be made on a conductive, nonpainted surface. Lockwashers must be used on all connections to prevent connection hardware from working loose.

Data Communications Cables Power transformers and heavy foot traffic create high energy fields. Route data communications cables away from these areas. Use shielded data communications cables that meet approved industry standards to reduce the effects of external fields. Data cables that are run externally to a metal fire enclosure must have a minimum fire rating of VW-1 or VW-4 or better.

Environmental Elements

The following environmental elements can affect a Superdome server installation:

- Computer room preparation
- Cooling requirements
- Humidity level
- Air conditioning ducts
- Dust and pollution control
- Electrostatic discharge (ESD) prevention
- Acoustics (noise reduction)
- Zinc whisker control

Computer Room Preparation

The following guidelines are recommended when preparing a computer room for a Superdome server system:

- Locate the computer room away from the exterior walls of the building to avoid the heat gain from windows and exterior wall surfaces.
- When exterior windows are unavoidable, use windows that are double- or triple-glazed and shaded to prevent direct sunlight from entering the computer room.
- Maintain the computer room at a positive pressure relative to surrounding spaces.
- Use a vapor barrier installed around the entire computer room envelope to restrain moisture migration.
- Caulk and vapor seal all pipes and cables that penetrate the envelope.
- Use at least a 12-inch raised floor system for the most favorable room air distribution system (underfloor distribution).

- Ensure a minimum ceiling height of 12 inches between the top of the server and the ceiling. Ensure all ceiling clips are in place.

Cooling Requirements

Air conditioning equipment requirements and recommendations are described in the following sections.

Basic Air Conditioning Equipment Requirements The cooling capacity of the installed air conditioning equipment for the computer room should be sufficient to offset the computer equipment dissipation loads, as well as any space envelope heat gain. This equipment should include:

- Air filtration
- Cooling or dehumidification
- Humidification
- Reheating
- Air distribution
- System controls adequate to maintain the computer room within the operating ranges listed in Table 5-1.

Table 5-1 Controlled Computer Room Environment Specifications

Temperature (dry bulb °C)[a]		Relative Humidity %; Non condensing		Dew Point[b]	Rate of Change (°C/hr., max)
Allowable[c,d]	Recommended[e]	Allowable[d]	Recommended[e]		
15 to 32 (59° to 90° F)	20 to 25 (68° to 77° F)	20 to 80	40 to 55	17	5

a. Dry bulb temperature is the regular ambient temperature. Derate maximum dry bulb temperature 1°C/300 m above 900 m.
b. Must be non-condensing environment.
c. With installed media, the minimum temperature is 15°C and maximum relative humidity is limited to 80%. Specific media requirements may vary.
d. Allowable: equipment design extremes as measured at the equipment inlet.
e. Recommended: target facility design and operational range.

Lighting and personnel must also be included. For example, a person dissipates about 450 BTUs per hour while performing a typical computer room task.

At altitudes above 10,000 feet (3048 m), the lower air density reduces the cooling capability of air conditioning systems. If your facility is located above this altitude, the recommended temperature ranges may need to be modified.

Air Conditioning System Guidelines The following guidelines are recommended when designing an air conditioning system and selecting the necessary equipment:

- The air conditioning system serveing the computer room should be capable of operating 24 hours a day, 365 days a year. It should also be independent of other systems in the building.
- Consider the long-term value of computer system availability, redundant air conditioning equipment, or capacity.
- The system should be capable of handling any future computer system expansion.
- Air conditioning equipment air filters should have a minimum rating of 45% (based on “AShRA Standard 52-76, Dust Spot Efficiency Test”).
- Introduce only enough outside air into the system to meet building code requirements (for human occupancy) and to maintain a positive air pressure in the computer room.

Air Conditioning System Types The following three air conditioning system types are listed in order of preference:

- Complete self-contained package unit(s) with remote condenser(s). These systems are available with u, or down discharge and are usually located in the computer room.
- Chilled water package unit with remote chilled water plant. These systems are available with up or down discharge and are usually located in the computer room.
- Central station air handling units with remote refrigeration equipment. These systems are usually located outside the computer room.

Basic Air Distribution Systems A basic air distribution system includes supply air and return air.

An air distribution system should be zoned to deliver an adequate amount of supply air to the cooling air intake vents of the computer system equipment cabinets. Supply air temperature should be maintained within the following parameters:

- Ceiling supply system—From 55° F (12.8° C) to 60° F (15.6° C)
- Floor supply system—At least 60° F (15.6° C)

If a ceiling plenum return air system or a ducted ceiling return air system is used, the return air grille(s) in the ceiling should be located directly above the computer equipment cabinets.

The following three types of air distribution system are listed in order of recommendation:

- Underfloor air distribution system—Downflow air conditioning equipment located on the raised floor of the computer room uses the cavity beneath the raised floor as plenum for the supply air.

  Return air from an underfloor air distribution system can be ducted return air (DRA) above the ceiling, as shown in Figure 5-3 on page 142.

  Perforated floor panels (available from the raised floor manufacturer) should be located around the perimeter of the system cabinets. Supply air emitted though the perforated floor panels is then available near the cooling air intake vents of the computer system cabinets.
- Ceiling plenum air distribution system—Supply air is ducted into the ceiling plenum from upflow air conditioning equipment located in the computer room or from an air handling unit (remote).

  The ceiling construction should resist air leakage. Place perforated ceiling panels (with down discharge air flow characteristics) around the perimeter of the system cabinets. The supply air emitted downward from the perforated ceiling panels is then available near the cooling air intake vents of the computer system cabinets.

  Return air should be ducted back to the air conditioning equipment though the return air duct above the ceiling.
- Above ceiling ducted air distribution system—Supply air is ducted into a ceiling diffuser system from upflow air conditioning equipment located in the computer room or from an air handling unit (remote).

  Return air from an above ceiling ducted air distribution system may be ducted return air (DRA) above the ceiling, as shown in Figure 5-5 on page 144, or ceiling plenum return air (CPRA), as shown in Figure 5-4 on page 143.

  Adjust the supply air diffuser system grilles to direct the cooling air downward around the perimeter of the computer system cabinets. The supply air is then available near the cooling air intake vents of the computer system cabinets.

Air Conditioning System Installation All air conditioning equipment, materials, and installation must comply with any applicable construction codes. Installation of the various components of the air conditioning system must also conform to the air conditioning equipment manufacturer’s recommendations.

Figure 5-3 on page 142 illustrates a typical computer room underfloor air distribution system (DRA).

Figure 5-4 on page 143 illustrates a typical computer room ceiling plenum air distribution system (CPRA).

Figure 5-5 on page 144 illustrates a typical computer room above ceiling ducted air distribution system (DRA).

Figure 5-2 Typical Computer Room Raised Floor Layout

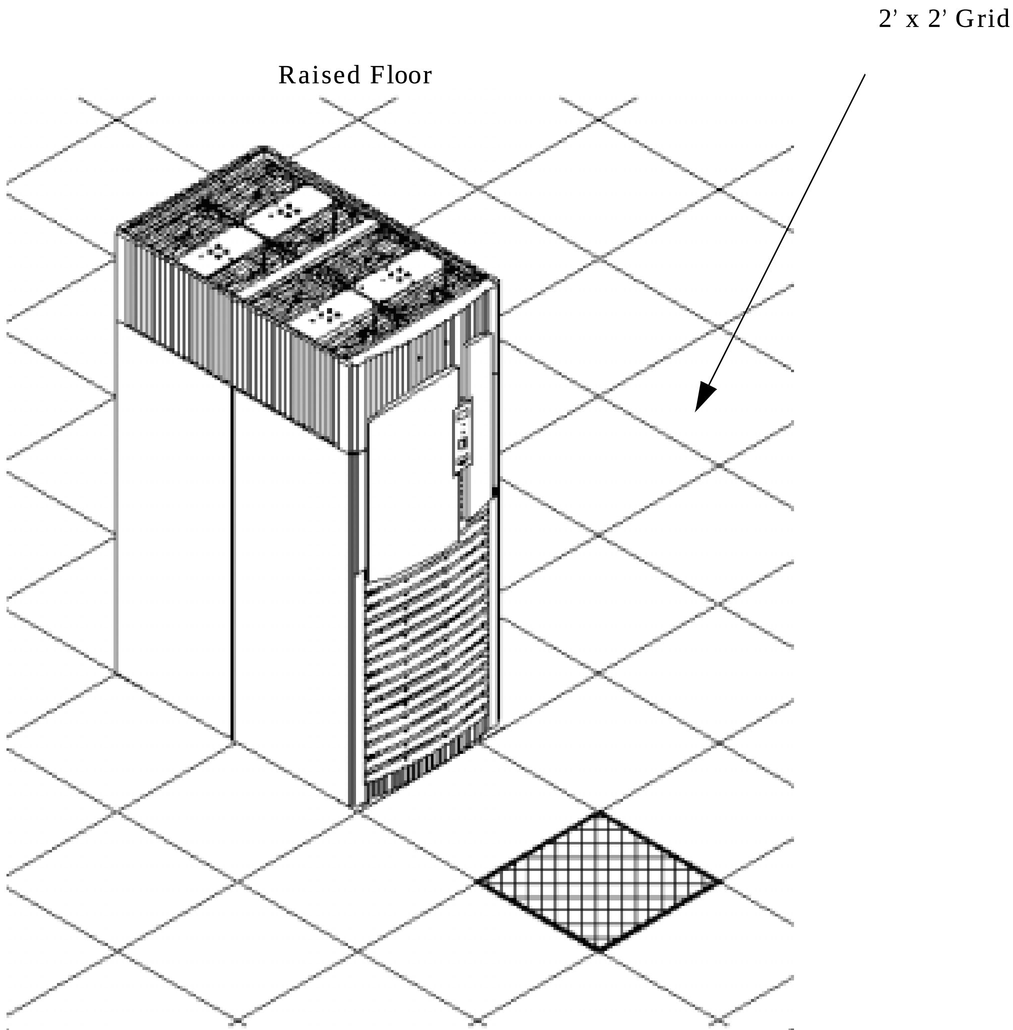


Figure 5-3 Underfloor Air Distribution System

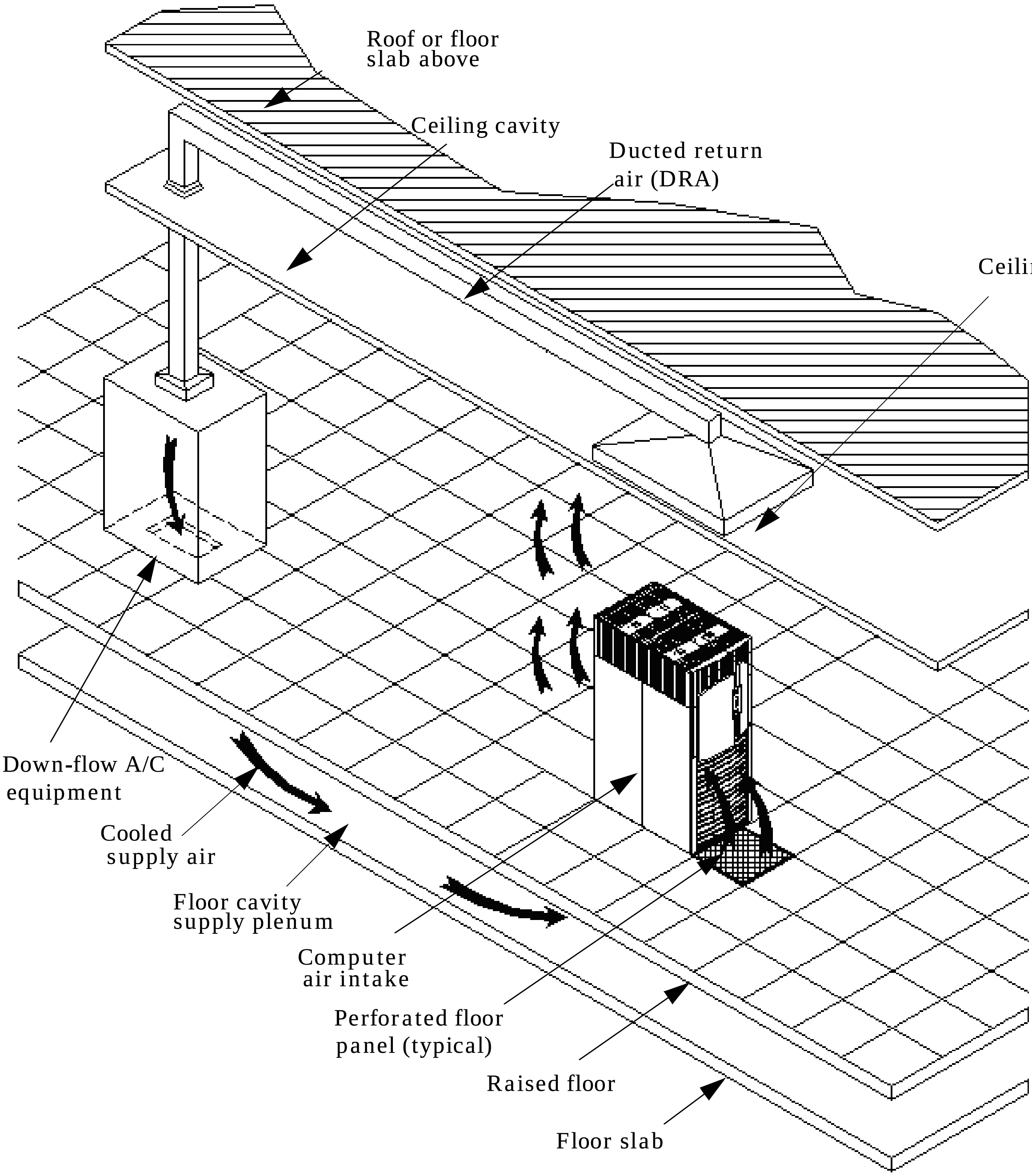


Figure 5-4 Ceiling Plenum Air Distribution System

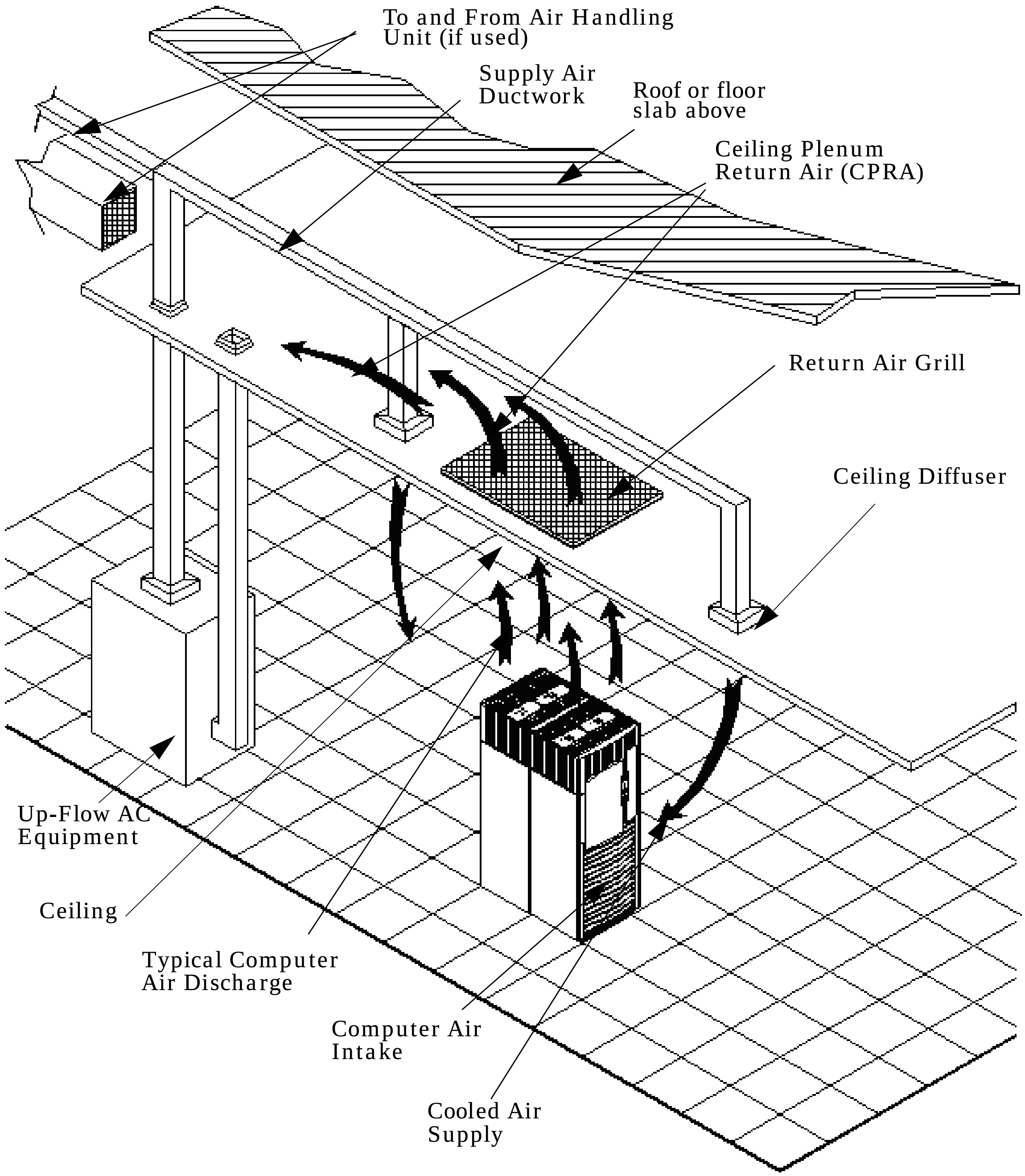
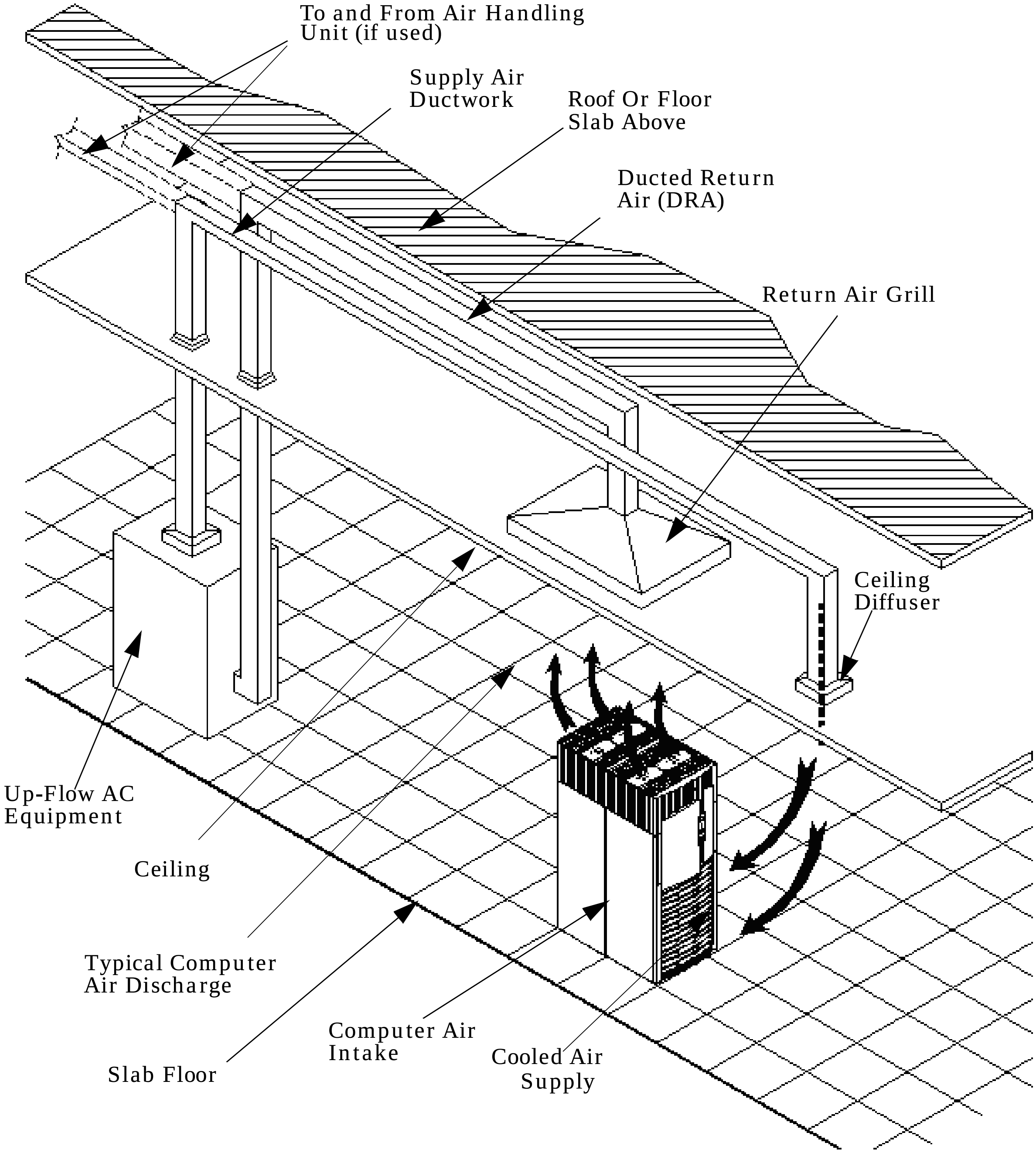


Figure 5-5 Above Ceiling Ducted Air



Humidity Level

Maintain proper humidity levels. High humidity causes galvanic actions to occur between some dissimilar metals. This eventually causes a high resistance between connections, leading to equipment failures. High humidity can also have an adverse affect on some magnetic tapes and paper media.

CAUTION Low humidity contributes to undesirably high levels of electrostatic charges. This increases the electrostatic discharge (ESD) voltage potential. ESD can cause component damage during servicing operations. Paper feed problems on high-speed printers are usually encountered in low-humidity environments.

Low humidity levels are often the result of the facility heating system and occur during the cold season. Most heating systems cause air to have a low humidity level, unless the system has a built-in humidifier.

Air Conditioning Ducts

Use separate computer room air conditioning duct work. If it is not separate from the rest of the building, it might be difficult to control cooling and air pressure levels. Duct work seals are important for maintaining a balanced air conditioning system and high static air pressure. Adequate cooling capacity means little if the direction and rate of air flow cannot be controlled because of poor duct sealing. Also, the ducts should not be exposed to warm air, or humidity levels may increase.

Dust and Pollution Control

Computer equipment can be adversely affected by dust and microscopic particles in the site environment.

Specifically, disk drives, tape drives, and some other mechanical devices can have bearing failures resulting from airborne abrasive particles. Dust may also blanket electronic components like printed circuit boards causing premature failure due to excess heat and/or humidity build up on the boards. Other failures to power supplies and other electronic components can be caused by metallically conductive particles. These metallic particles are conductive and can short circuit electronic components. Use every effort to ensure that the environment is as dust and particulant free as possible.

Smaller particles can pass though some filters and, over a period of time, possibly cause problems in mechanical parts. Small dust particles can be prevented from entering the computer room by maintaining its air conditioning system at a high static air pressure level.

Other sources of dust, metallic, conductive, abrasive, and/or microscopic particles can be present. Some sources of these particulants are:

- Subfloor shedding
- Raised floor shedding
- Ceiling tile shedding

These pollutants are not always visible to the naked eye. A good check to determine their possible presence is to check the underside of the tiles. The tile should be shiny, galvanized, and free from rust.

The computer room should be kept clean. The following guidelines are recommended:

- Smoking—Establish a no-smoking policy. Cigarette smoke particles are eight times larger than the clearance between disk drive read/write heads and the disk surface.
- Printer—Locate printers and paper products in a separate room to eliminate paper particulate problems.
- Eating or drinking—Establish a no-eating or drinking policy. Spilled liquids can cause short circuits in equipment such as keyboards.
- Tile floors—Use a dust-absorbent cloth mop rather than a dry mop to clean tile floors.

Special precautions are necessary if the computer room is near a source of air pollution. Some air pollutants, especially hydrogen sulfide (H2S), are not only unpleasant but corrosive as well. Hydrogen sulfide damages wiring and delicate sound equipment. The use of activated charcoal filters reduces this form of air pollution.

Metallic Particulate Contamination

Metallic particulates can be especially harmful around electronic equipment. This type of contamination may enter the data center environment from a variety of sources, including but not limited to raised floor tiles, worn air conditioning parts, heating ducts, rotor brushes in vacuum cleaners or printer component wear. Because metallic particulates conduct electricity, they have an increased potential for creating short circuits in electronic equipment. This problem is exaggerated by the increasingly dense circuitry of electronic equipment.

Over time, very fine whiskers of pure metal can form on electroplated zinc, cadmium, or tin surfaces. If these whiskers are disturbed, they may break off and become airborne, possibly causing failures or operational interruptions. For over 50 years, the electronics industry has been aware of the relatively rare but possible threat posed by metallic particulate contamination. During recent years, a growing concern has developed in computer rooms where these conductive contaminants are formed on the bottom of some raised floor tiles.

Although this problem is relatively rare, it may be an issue within your computer room. Since metallic contamination can cause permanent or intermittent failures on your electronic equipment, Hewlett-Packard strongly recommends that your site be evaluated for metallic particulate contamination before installation of electronic equipment.

Electrostatic Discharge (ESD) Prevention

Static charges (voltage levels) occur when objects are separated or rubbed together. The voltage level of a static charge is determined by the following factors:

- Types of materials
- Relative humidity
- Rate of change or separation

Table 5-2 lists charge levels based on personnel activities and humidity levels.

Table 5-2 Effect of Humidity on ESD Charge Levels

Personnel Activity[a]	Humidity[b] and Charge Levels (volts)[c]			
	26%	**32%**	**40%**	**50%**
Walking across a linoleum floor	6,150	5,750	4,625	3,700
Walking across a carpeted floor	18,450	17,250	13,875	11,100
Getting up from a plastic chair	24,600	23,000	18,500	14,800

a. Source: B.A.Unger, Electrostatic Discharge Failures of Semiconductor Devices (Bell Laboratories,1981)
b. For the same relative humidity level, a high rate of airflow produces higher static charges than a low airflow rate.
c. Some data in this table has been extrapolated.

Static Protection Measures Follow these precautions to minimize possible ESD-induced failures in the computer room:

- Install conductive flooring (conductive adhesive must be used when laying tiles).
- Use conductive wax (if waxed floors are necessary).
- Ensure that all equipment and flooring are properly grounded and are at the same ground potential.

- Use conductive tables and chairs.
- Use a grounded wrist strap (or other grounding method) when handling circuit boards.
- Store spare electronic modules in antistatic containers.
- Maintain recommended humidity level and airflow rates in the computer room.

Acoustics

Computer equipment and air conditioning blowers cause computer rooms to be noisy. Ambient noise level in a computer room can be reduced as follows:

- Dropped ceiling—Cover with a commercial grade of fire-resistant, acoustic rated, fiberglass ceiling tile.
- Sound deadening—Cover the walls with curtains or other sound deadening material.
- Removable partitions—Use foam rubber models for most effectiveness.

Facility Guidelines

This section describes facility characteristics and provides guidelines for preparing the computer room.

- “Facility Characteristics” on page 148 discusses architectural issues.
- “Space Requirements” on page 151 discusses the amount of floor space required by the components.

NOTE Refer to Appendix C for templates to aid in locating caster contact area and caster/leveling foot centers. Templates are also provided to locate required cutouts for cable routing.

Facility Characteristics

This section contains information about facility characteristics that must be considered for the installation or operation of a Superdome server. Facility characteristics are:

- Floor loading
- Windows
- Altitude effects

Floor Loading

The computer room floor must be able to support the total weight of the installed computer system as well as the weight of the individual cabinets as they are moved into position.

Floor loading is usually not an issue in non-raised-floor installations. The information presented in this section is directed toward raised-floor installations.

NOTE Any floor system under consideration for a Superdome server installation should be verified by an appropriate floor system consultant.

Raised-Floor Loading Raised-floor loading is a function of the manufacturer’s load specification and the positioning of the equipment relative to the raised-floor grid. While Hewlett-Packard cannot assume responsibility for determining the suitability of a particular raised-floor system, information and illustrations are provided for the customer or local agencies to determine installation requirements.

The following guidelines are recommended:

- Because many raised-floor systems do not have grid stringers between floor stands, the lateral support for the floor stands depends on adjacent panels being in place. To avoid compromising this type of floor system while gaining under floor access, remove only one floor panel at a time.
- Larger floor grids (bigger panels) are generally rated for lighter loads.

CAUTION Do not install any raised-floor system until you have carefully examined it to verify that it is adequate to support the appropriate installation.

Floor-Loading Terms Table 5-3 defines floor-loading terms.

Table 5-3 Floor-Loading Terms

Term	Definition
Dead load	Weight of the raised-panel floor system, including the understructure. Expressed in lb/ft2 (kg/m2).
Live load	Load the floor system can safely support. Expressed in lb/ft2 (kg/m2).
Concentrated load	Load a floor panel can support on a 1-in2 (6.45 cm2) area at the panel's weakest point (typically the center of the panel), without the surface of the panel deflecting more than a predetermined amount.
Ultimate load	Maximum load (per floor panel) the floor system can support without failure. Failure expressed by floor panel(s) breaking or bending. Ultimate load is usually stated as load per floor panel.
Rolling load	Load a floor panel can support (without failure) when a wheel of specified diameter and width is rolled across the panel.
Average floor load	Computed by dividing total equipment weight by the area of its footprint. This value is expressed in lb/ft2 (kg/m2).

Average Floor Loading The average floor load value, defined in Table 5-4, is not appropriate for addressing raised-floor ratings at the floor grid spacing level. However, it is useful for determining floor-loading at the building level, such as the area of solid floor or span of raised-floor tiles covered by the Superdome server footprint.

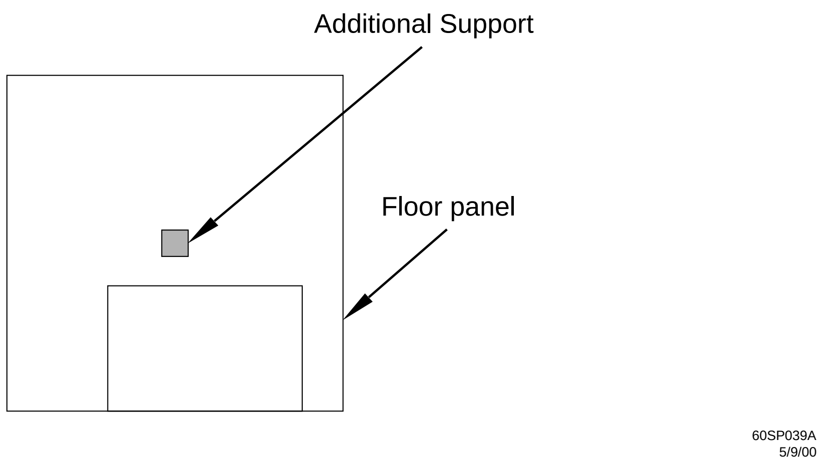
Typical Raised-Floor Site This section contains an example of a computer room raised-floor system that is satisfactory for the installation of a Superdome server.

Based on specific information provided by Hewlett-Packard, Tate Access Floors has approved its Series 800 all-steel access floor with bolt-together stringers and 24 in. (61.0 cm) by 24 in. (61.0 cm) floor panels.

Due to the large amount of floor panel material that must be removed for the purpose of routing cables, this particular floor must be braced as shown in Figure 5-6.

In the event that the flooring is being replaced or a new floor is being installed, Tate Access Floors recommends its Series 1250 all-steel access floor with bolt-together stringers and 24 in. (61.0 cm) by 24 in. (61.0 cm) floor panels be used to support the Superdome installation.

Figure 5-6 Tate Series 800 Floor Bracing



NOTE If the specific floor being evaluated or considered is other than a Tate Series 800 floor, the specific floor manufacturer must be contacted to evaluate the floor being used.

Table 5-4 lists specifications for the Tate Access Floors Series 800 raised-floor system.

Table 5-4 Tate Series 800 Raised-Floor Tile Specifications

Item	Rating
Dead load	7 lb/ft 2 (34.2 kg/m2)
Live load	313 lb/ft 2 (1528.3 kg/m2)
Concentrated load[a]	1250 lb (567 kg)
Ultimate load	4000 lb (1814 kg) per panel
Rolling load	400 lb (181 kg)
Average Tile load	500 lb (227 kg)

a. With 0.08 in (0.2 cm) of span maximum deflection

Windows

Avoid housing computers in a room with windows. Sunlight entering a computer room may cause problems. Magnetic tape storage media is damaged if exposed to direct sunlight. Also, the heat generated by sunlight places an additional load on the cooling system.

Space Requirements

This section contains information about space requirements for a Superdome server. This data should be used as the basic guideline for space plan developments. Other factors, such as airflow, lighting, and equipment space requirements, must also be considered.

Delivery Space Requirements

There should be enough clearance to move equipment safely from the receiving area to the computer room. Permanent obstructions, such as pillars or narrow doorways, can cause equipment damage.

Delivery plans should include the possible removal of walls or doors. The physical dimensions for applicable computers and peripheral equipment are summarized in Appendix A.

Operational Space Requirements

Other factors must be considered along with the basic equipment dimensions. Reduced airflow around equipment causes overheating, which can lead to equipment failure. Therefore, the location and orientation of air conditioning ducts, as well as airflow direction, are important. Obstructions to equipment intake or exhaust airflow must be eliminated.

The location of lighting fixtures and utility outlets affects servicing operations. Plan equipment layout to take advantage of lighting and utility outlets. Do not forget to include clearance for opening and closing equipment doors.

Clearance around and above the cabinets must be provided for proper cooling airflow through the equipment.

The service area space requirements, outlined in Appendix C, are minimum dimensions. If other equipment is located so that it exhausts heated air near the cooling air intakes of the computer system cabinets, larger space requirements are needed to keep ambient air intake to the computer system cabinets within the specified temperature and humidity ranges.

Space planning should also include the possible addition of equipment or other changes in space requirements. Equipment layout plans should also include provisions for the following:

- Channels or fixtures used for routing data cables and power cables
- Access to air conditioning ducts, filters, lighting, and electrical power hardware
- Power conditioning equipment
- Cabinets for cleaning materials
- Maintenance area and spare parts

Floor Plan Grid

The floor plan grid is used to plan the location of equipment in the computer room. In addition to its use for planning, the floor plan grid should also be used when planning the locations of the following items:

- Air conditioning vents
- Lighting fixtures
- Utility outlets
- Doors
- Access areas for power wiring and air conditioning filters
- Equipment cable routing

Copies of the floor plan grid are located in Appendix C.

Equipment Footprint Templates

Equipment footprint templates are provided in Appendix C to show basic equipment dimensions and space requirements for servicing. Be sure to use the appropriate templates for the equipment that is to be installed.

The service areas shown on the template drawings are lightly shaded.

Removable copies of the equipment footprint templates are located in Appendix C. They should be used with the floor plan grid to define the location of the equipment that will be installed in your computer room.

NOTE Photocopying typically changes the scale of drawings copied. If any templates are copied, then all templates and floor plan grids must also be copied.

Power Options

Table 5-5 describes the available power options. It may be unusual to list Options 6 and 7 and not 1 and 2. The options listed are consistent with previous options for earlier Superdome systems.

Table 5-5 Available Power Options

Option	Source Type	Source Voltage (nominal)	PDCA Required	Input Current Per Phase 200-240 VAC [a]	Power Receptacle Required
6	3-phase	Voltage range 200-240 VAC, phase-to-phase, 50 Hz / 60 Hz	four-wire	44A Maximum per phase	Connector and plug provided with a 2.5-meter power cable. Electrician must hard-wire receptacle to 60A site power.
7	3-phase	Voltage range 200-240 VAC, phase-to-neutral, 50 Hz / 60 Hz	five-wire	24A Maximum per phase	Connector and plug provided with a 2.5-meter power cable. Electrician must hard-wire receptacle to 32A site power.

a. A dedicated branch circuit is required for each PDCA installed.

Table 5-6 Option 6 and 7 Specifics

PDCA Part Number	Attached Power Cord	Attached Plug	Receptacle Required
A5201-69023 (Option 6)	OLFLEX 190 (PN 600804) is a 2.5 meter multi conductor, 600 volt, 90 degree C, UL and CSA approved, oil resistant flexible cable. (8 AWG 60 A capacity)	Mennekes ME 460P9 (60 A capacity)	Mennekes ME 460R9 (60 A capacity)
A5201-69024 (Option 7)	H07RN-F (OLFLEX PN 1600130) is a 2.5 meter heavy duty neoprene jacketed harmonized European flexible cable. (4 mm^2 32A capacity)	Mennekes ME 532P6-14 (32A capacity)	Mennekes ME 532R6-1500 (32 A capacity)

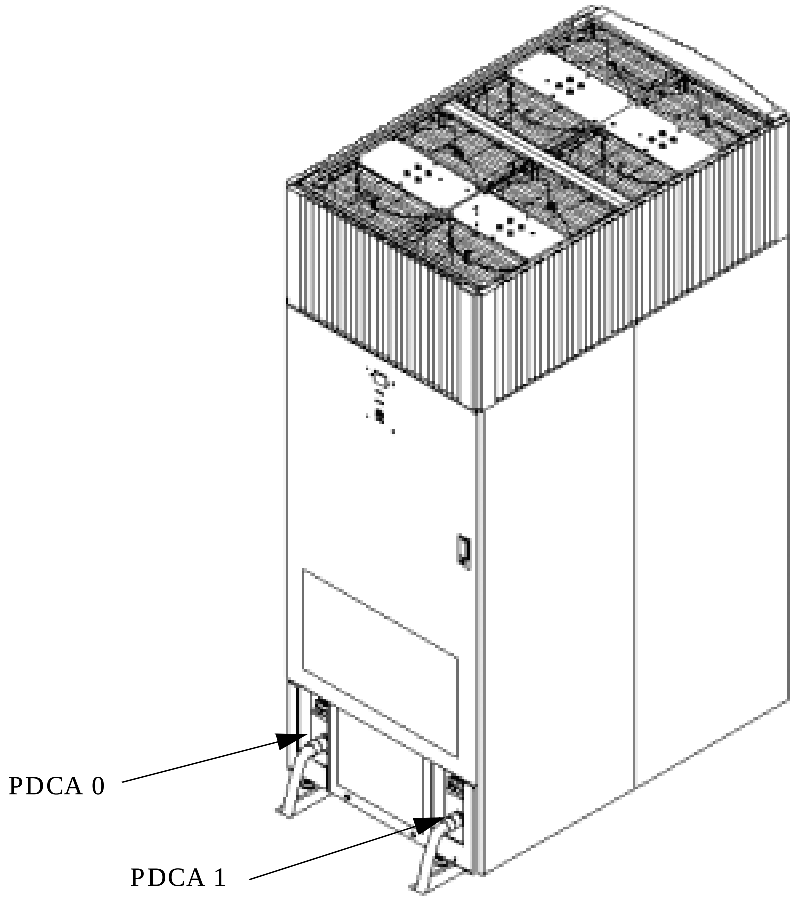
NOTE A qualified electrician must wire the PDCA receptacle to site power using copper wire and in compliance with all local codes.

Each branch circuit used within a complex must be connected together to form a common ground.

When only one PDCA is to be installed in a system cabinet, it must be installed as PDCA0. Refer to Figure 5-7 for PDCA0 location.

NOTE When wiring a PDCA, phase rotation is unimportant. When using two PDCAs, however, the rotation must be consistent for both.

Figure 5-7 PDCA Locations



Power Cords

This section discusses the different possibilities for PDCA power cords.

Pre-wired PDCAs Options 6 and 7

All servers are delivered with the appropriate cable and plug. The mating in-line connector is not provided.

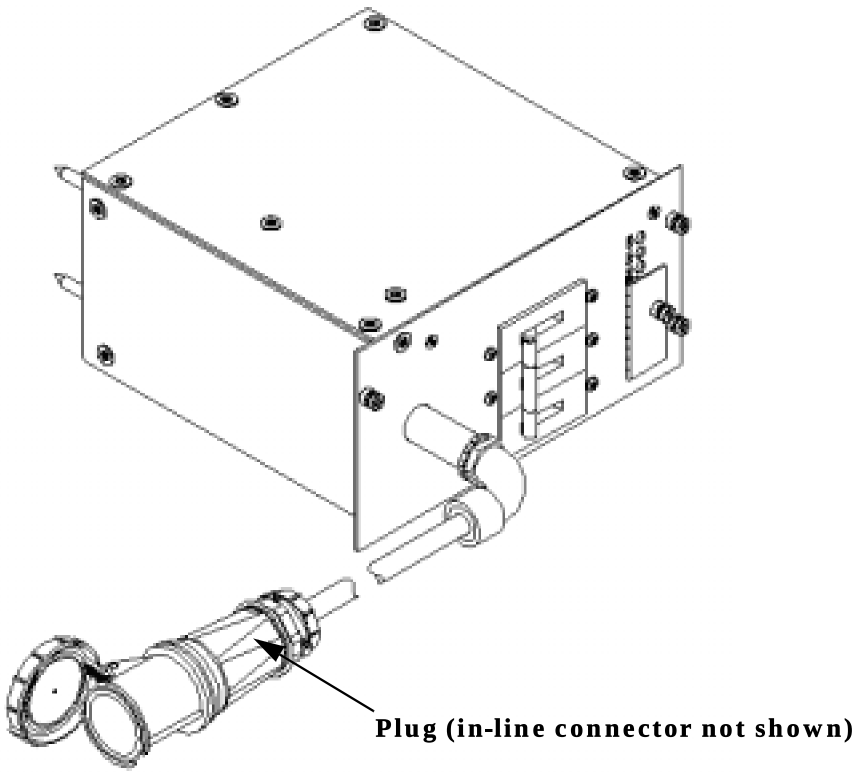
IMPORTANT Verify that the source power is correct for the appropriate PDCA wiring.

NOTE When installing the power connector, allow enough room for mating the connector with the plug.

Check the voltages at the connector prior to connecting the newly installed connector to the PDCA plug. Refer to Figure 5-9 and Figure 5-10 on page 156 for pin locations.

- To verify the proper wiring for a 4-wire PDCA, use a DVM to measure the voltage at the in-line connector. Voltage should read 200 - 240 Vac phase-to-phase as measured between the connector pins as follows: L1 to L2, L2 to L3, L1 to L3.
- To verify the proper wiring for a 5-wire PDCA, use a DVM to measure the voltage at the connector. Voltage should read 200 - 240 Vac phase-to-neutral as measured between the connector pins as follows: L1 to N, L2 to N, L3 to N.

Figure 5-8 PDCA Assembly for Options 6 and 7 (4-Wire Unit Shown)



IMPORTANT Ensure that your DVM is capable of measuring AC voltages of at least 500VAC. A number of 5-wire power distribution systems may have phase-to-phase voltages in excess of 400VAC. Many hand-held volt meters are limited to 300VAC.

Figure 5-9 Four-Wire In-Line Connector

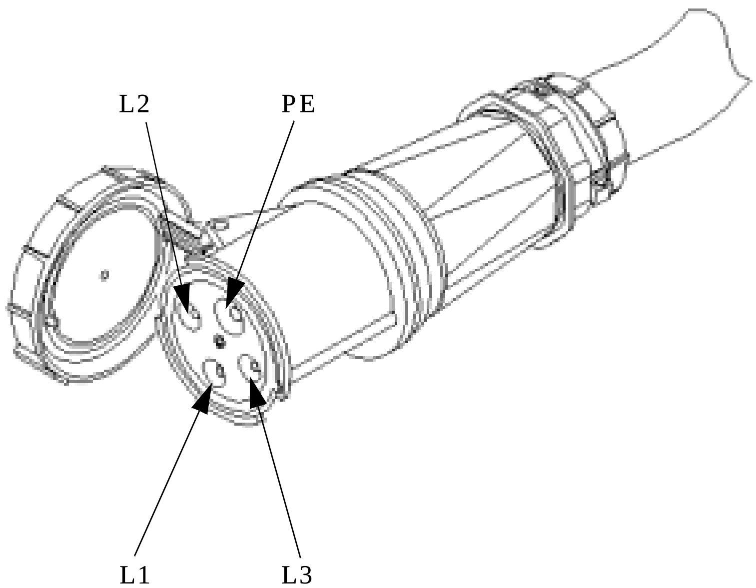
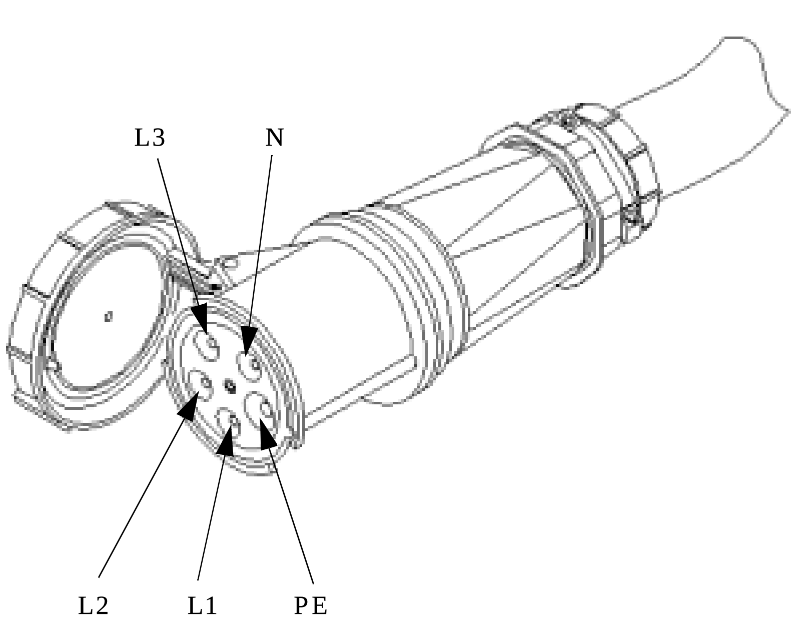


Figure 5-10 Five-Wire In-Line Connector



Cable Removal

Some installations may either require or desire that the cabinet(s) be hardwired in lieu of using the standard plugs and connectors provided. In these cases, it is necessary to remove the installed power cable from the PDCA. The following procedures are used to remove and replace the existing power cable.

To remove the existing cable from the PDCA, begin be removing the five T-10 Torx screws detailed in Figure 5-11 on page 158. Then remove the bottom panel of the PDCA. Retain the panel and screws for future use.

NOTE The cable removal and installation requires only the bottom panel to be removed. For image clarity, Figure 5-11 does not show cable or cable strain relief.

Step 1. Locate and remove the PDCAs.

Step 2. Remove the five screws securing the bottom of the PDCA. Retain the screws. Refer to Figure 5-11 for details.

Step 3. Disconnect the existing wires from the PDCA terminal lugs. Refer to Figure 5-11 for details.

NOTE Loosen the cable side terminal lugs only. Do not loosen the PDCA side terminal lugs.

NOTE For 5-wire cables, loosen four lugs. For 4-wire cables, loosen three lugs.

Step 4. Using an 11-mm socket, remove the safety ground cable (green and yellow cable). Retain the attaching hardware.

Step 5. Remove the cable from the PDCA. Keep all retaining hardware for use during installation of the new cable.

Figure 5-11 PDCA Cable Access (5-Wire Unit Shown)

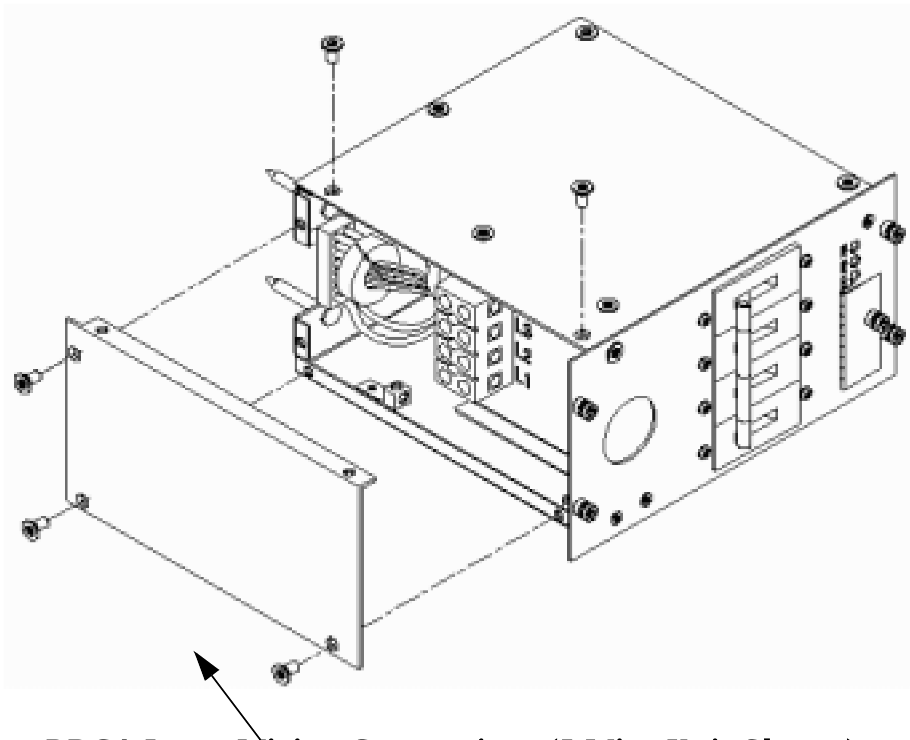
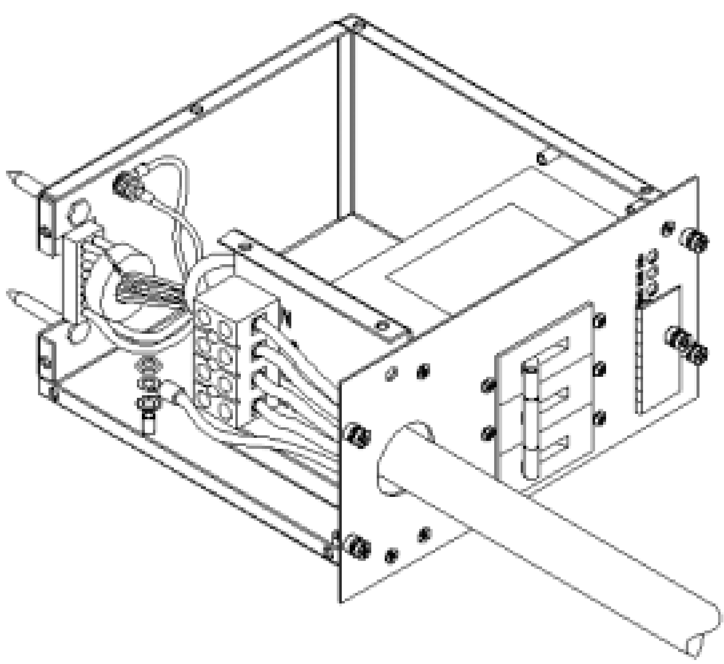


Figure 5-12 PDCA Input Wiring Connections (5-Wire Unit Shown)



Cable Installation

NOTE These procedures may be used for early deliveries consisting of either option 1 or option 2 as well as those later systems delivered with PDCA cables attached.

Select the proper cable using the following criteria.

- Each cabinet using a 3-phase, 4-wire input is required to have a four-conductor cable. The four-conductor cable selected by the facility electrician shall be in accordance with local electrical codes to support the selected circuit breaker for the maximum Product Label current of 44A per phase. The facility electrician and local electrical codes will determine proper power cord selection dependent upon desired application such as rigid conduit, flexible conduit, or cable bundle. Observe derating factors for multiple wires per cable.
- Each cabinet using a 3-phase 5-wire input is required to have a five-conductor cable. The five-conductor cable selected by the facility electrician shall be in accordance with local electrical codes to support the selected circuit breaker for the maximum Product Label current of 24A per phase. The facility electrician and local electrical codes will determine proper power cord selection dependent upon desired application such as rigid conduit, flexible conduit, or cable bundle. Observe derating factors for multiple wires per cable.

Step 1. Prepare the new cable as shown in Figure 5-13 on page 160.

Step 2. Using the cable retaining hardware saved from the cable removal, route the new cable into the PDCA.

Step 3. Route the cable into the PDCA terminal lugs and secure in position by tightening the lugs.

Step 4. Using the hardware that was retained during the cable removal, attach the green and yellow ground cable.

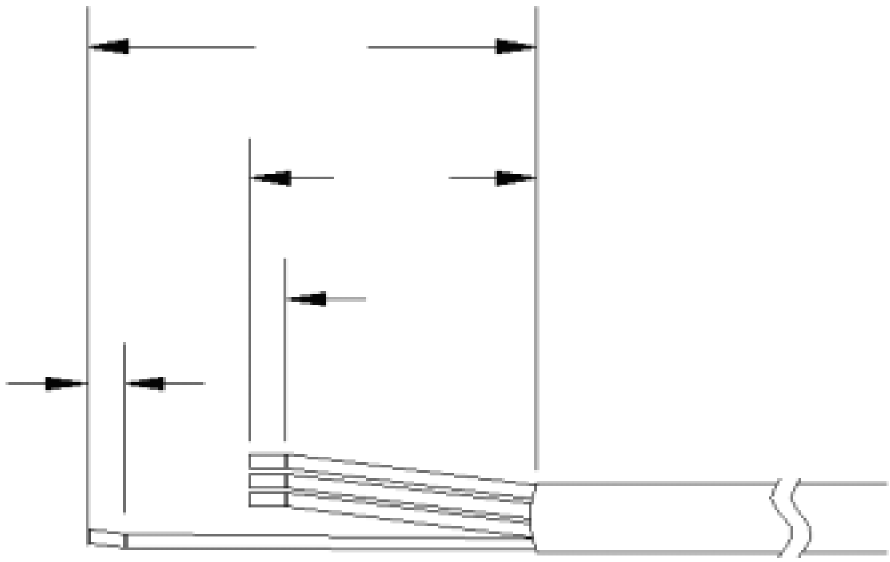
Step 5. Using the five screws retained from the removal procedure, replace the bottom panel on the PDCA. Refer to Figure 5-11 on page 158 for panel installation details.

Step 6. To verify the proper wiring to a 4-wire PDCA, use a DVM to measure the voltage at the test points. Voltage should read 200 - 240 Vac phase-to-phase as measured between the test points as follows: L1 to L2, L2 to L3, L1 to L3.

IMPORTANT In some electrical distributions around the world, it is possible to measure 415 VAC phase-to-phase. Ensure that your DVM is capable of measuring AC voltages of at least 500VAC. A number of 5-wire power distribution systems may have phase-to-phase voltages in excess of 400VAC. Many hand-held volt meters are limited to 300VAC.

To verify the proper wiring to a 5-wire PDCA, use a DVM to measure the voltage at the test points. Voltage should read 200-240VAC phase-to-neutral, as measured between the test points as follows: L1 to N, L2 to N, L3 to N.

Figure 5-13 Cable Preparation Detail



NOTE Dimensions shown are for a cable strain relief without an extension nipple. If an extension nipple is used, then the cable jacket must removed accordingly.

NOTE Figure 5-13 shows a 4-wire cable for illustrative purposes only. 5-wire cable is dimensionally identical regarding insulation and jacket removal. The only exception is the number of conductors.

Figure 5-14 PDCA (Five Wire) Input Wiring Connections

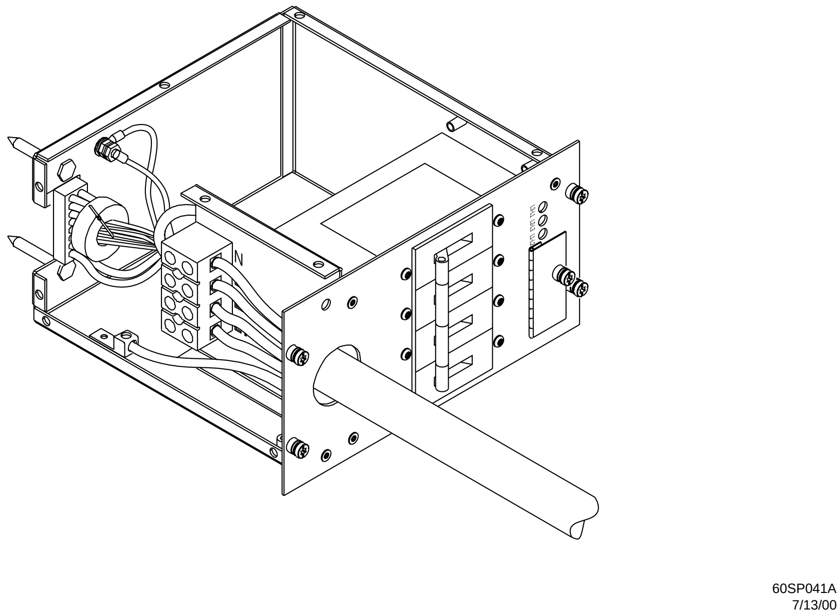
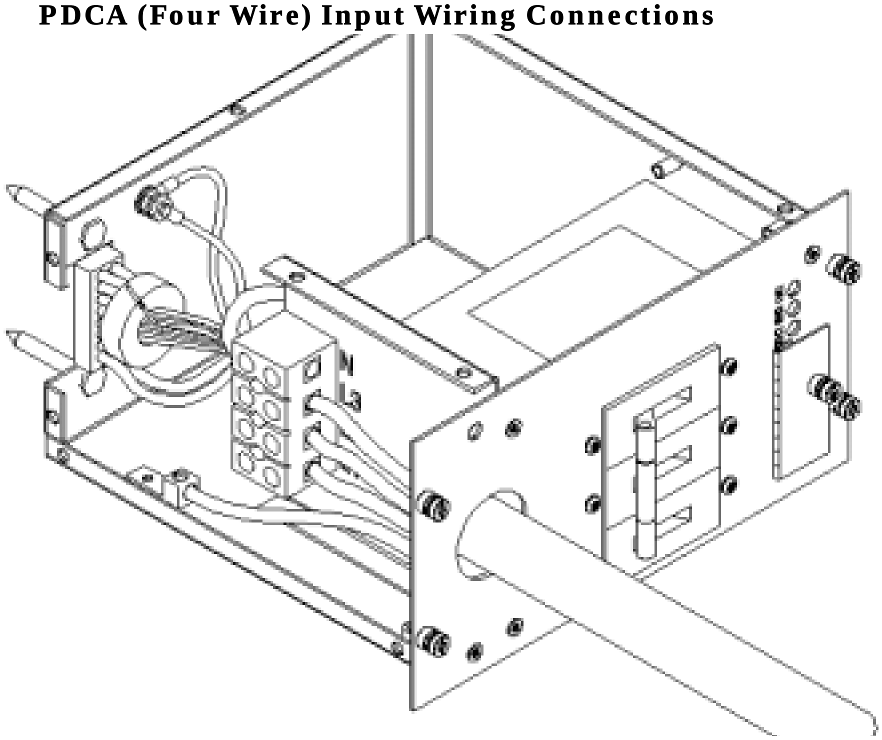


Figure 5-15 PDCA (Four Wire) Input Wiring Connections



Customer Installation Options

Figure 5-16 and Figure 5-17 detail a suggested configuration for connecting the PDCA when the use of rigid conduit is required or desired. Using a 2- to 4-inch nipple and a 90o elbow allows the conduit to pass through the raised floor at a point immediately past the cabinet. This prevents the conduit from extending beyond the cabinet.

Figure 5-16 PDCA Conduit Connection

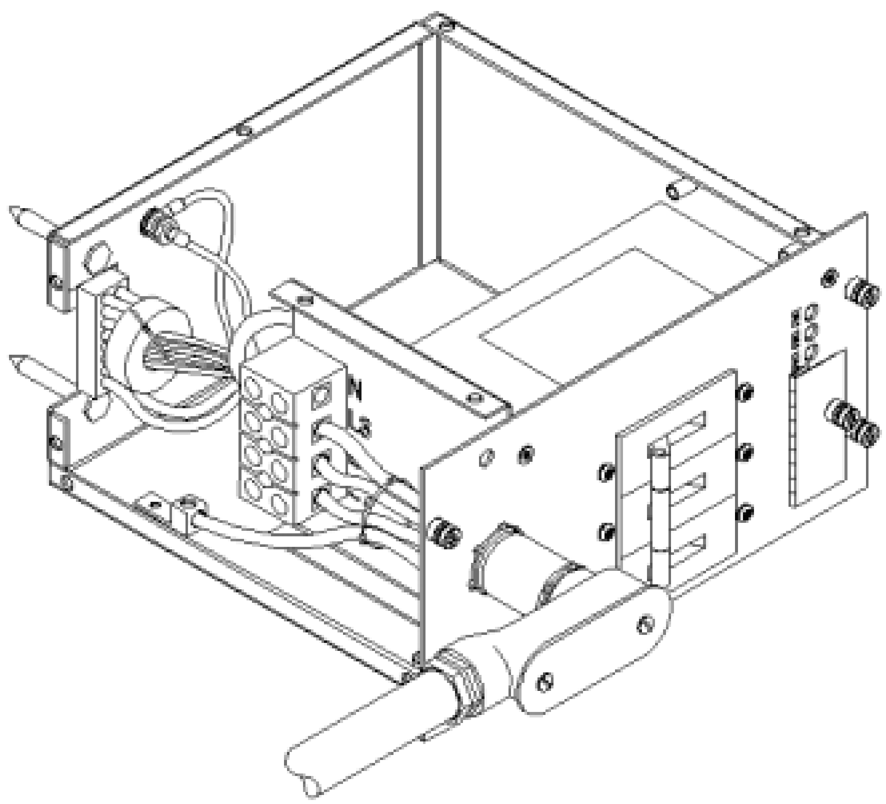
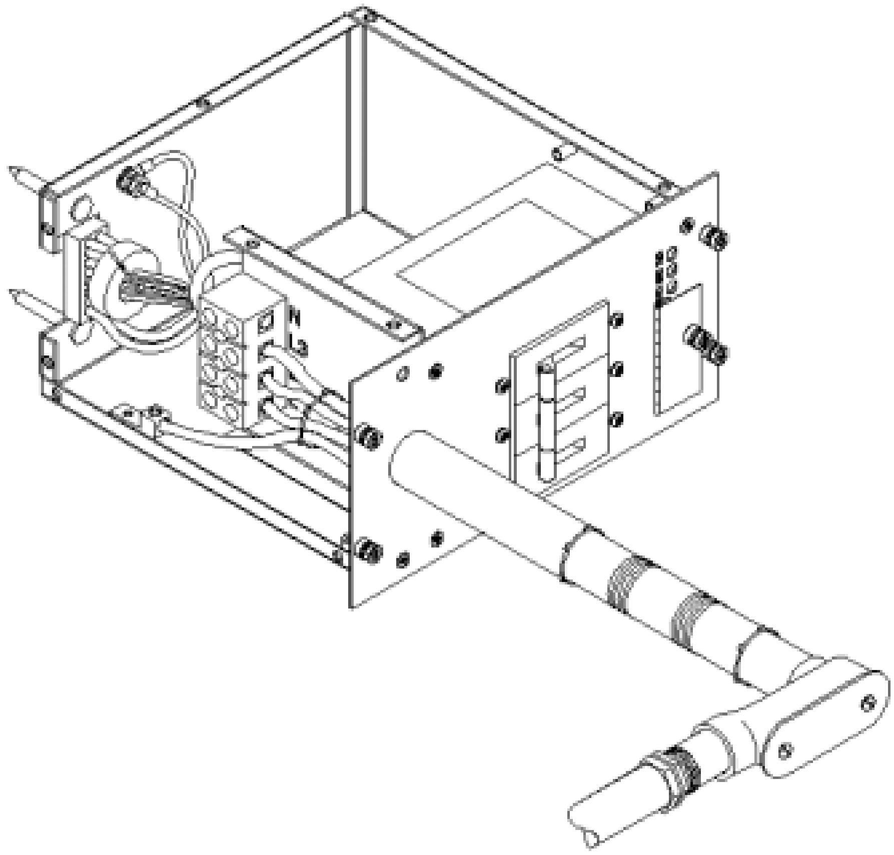


Figure 5-17 Conduit Required for PDCA Connection



Pre-Installation Survey

This chapter provides a site survey information packet consisting of an information form and checklists to be used to evaluate a computer facility. The checklists information sheets and information forms should be filled out by the customer and a Hewlett-Packard representative.

- "Pre-Installation Survey Content" on page 164 describes the contents of the site survey information packet.
- "Typical Installation Schedule" on page 164 describes the proposed schedule of installation events.
- "Site Inspection" on page 165 provides a sample pf the on-site inspection checklist.
- "Delivery Survey" on page 168 provides the delivery or installation requirement forms.

Pre-Installation Survey Content

The site pre-installation survey information is designed to identify problems that might occur before, during, or after the installation of the system. It contains the following items:

- Pre-installation checklists—Verify the customer site is ready for the equipment installation.
- Pre-installation survey information sheets—List customer name, address, and corresponding Hewlett-Packard sales personnel.
- Pre-installation survey information forms—List delivery information and special instructions.

Typical Installation Schedule

The following schedule lists the sequence of events for a typical system installation:

- 60 days before installation
  - Floor plan design completed and mailed to Hewlett-Packard
- 30 days before installation
  - Primary power and air conditioning installation completed
  - Telephone and data cables installed
  - Fire protection equipment installed
  - Major facility changes completed
  - Special delivery requirements defined
  - Site inspection survey completed
  - Delivery survey completed
  - Signed copy of the site inspection and delivery survey mailed to Hewlett-Packard
  - Site inspection and pre-delivery coordination meeting arranged with a Hewlett-Packard representative to review the inspection checklist and arrange an installation schedule.
- 7 days before installation
  - Final check made with a Hewlett-Packard customer engineer to resolve any last-minute problems

Site Inspection

Table 5-7 contains a sample of the Customer and Hewlett-Packard information required.

Table 5-8 contains a sample site inspection checklist.

IMPORTANT Ensure that the customer is aware of the iCOD email requirements. That is, each bootable partition requires a connection to the internet to send email to notify Hewlett-Packard that the customer has allocated additional CPUs beyond the amount initially purchased. Each bootable partition must be configured to perform this operation.

For more details, go to http://superdome.hp.com and click on the iCOD link.

NOTE Table 5-7 and Table 5-8 are provided as examples only. To ensure use of the current information specific to your site preparation, refer to the Site Readiness Review Section of the Deployment Manager's Handbook.

Table 5-7 Customer and Hewlett-Packard Information

Customer Information	
Name:	Phone No:
Street Address:	City or Town:
State or Province:	Country
Zip or postal code:	
Primary customer contact:	Phone No.:
Secondary customer contact:	Phone No.:
Traffic coordinator:	Phone No.:
Hewlett-Packard information	
Sales representative	Order No:
Representative making survey	Date:
Scheduled delivery date	

NOTE To ensure compliance with item 10 of Table 5-8, provide a copy of Appendix D to the customer to use a worksheet to identify required names and addresses for the LAN.

Table 5-8 Site Inspection Checklist

Please check either Yes or No. If No, include comment or date				Comment or Date
Computer room				
No.	Area or condition	Yes	No	
1.	Is there a completed floor plan?			
2.	Is there adequate space for maintenance needs? Front 42 in (106 cm) min., 48 in (121 cm) recommended. Rear 32 in (81 cm) min., 36 in (91cm) recommended			
3.	Is access to the site or computer room restricted?			
4.	Is the computer room structurally complete? Expected date of completion?			
5.	Is a raised floor installed and in good condition? What is the floor to ceiling height? [7.5 ft (228 cm) minimum]			
6.	Is the raised floor adequate for equipment loading?			
7.	Are there channels or cutouts for cable routing?			
8.	Is there a remote console telephone line available with an RJ11 jack?			
9.	Is a telephone line available?			
9a.	Is the customer aware of the iCOD email requirements? Each bootable partition requires a connection to the internet to send email to notify Hewlett-Packard that the customer has allocated additional CPUs beyond the amount initially purchased. Each bootable partition must be configured to perform this operation. For more details, go to http://superdome.hp.com and click on the iCOD link.			
10.	Are customer supplied peripheral and LAN cables available and of the proper type?			

Table 5-8 Site Inspection Checklist (Continued)

Please check either Yes or No. If No, include comment or date				Comment or Date
11.	Are floor tiles in good condition and properly braced?			
12.	Metallic particulate test required.			
Power and lighting				
No.	Area or condition	Yes	No	
13.	Are lighting levels adequate for maintenance?			
14.	Are there ac outlets available for servicing needs? (i.e. vacuuming)			
15.	Does the input voltage correspond to equipment specifications?			
15A	Is dual source power used? If so, identify type(s) and evaluate grounding.			
16	Does the input frequency correspond to equipment specifications?			
17.	Are lightning arrestors installed inside the building?			
18.	Is power conditioning equipment installed?			
19.	Is there a dedicated branch circuit for equipment?			
20.	Is the dedicated branch circuit less than 250 feet (72.5 meters)?			
21.	Are the input circuit breakers adequate for equipment loads?			
Safety				
No.	Area or condition	Yes	No	
22.	Is there an emergency power shut-off switch?			
23.	Is there a telephone available for emergency purposes?			
24.	Is there a fire protection system in the computer room?			
25.	Is antistatic flooring installed?			

Table 5-8 Site Inspection Checklist (Continued)

Please check either Yes or No. If No, include comment or date				Comment or Date
26.	Are there any equipment servicing hazards (loose ground wires, poor lighting, etc.)?			
Cooling				
No.	Area or condition	Yes	No	
27.	Can cooling be maintained between 68° and 86° (20° and 30° C)?			
28.	Can temperature changes be held to 9° (5 ° C) per hour?			
29.	Can humidity level be maintained between 40% and 55%?			
30.	Are air conditioning filters installed and clean?			
Storage				
No.	Area or condition	Yes	No	
31.	Are cabinets available for tape and disc media?			
32.	Is shelving available for documentation?			
Training				
No.	Area or Condition			
33	Are personnel enrolled in the System Administrator's Course?			
34	Is on-site training required?			

Delivery Survey

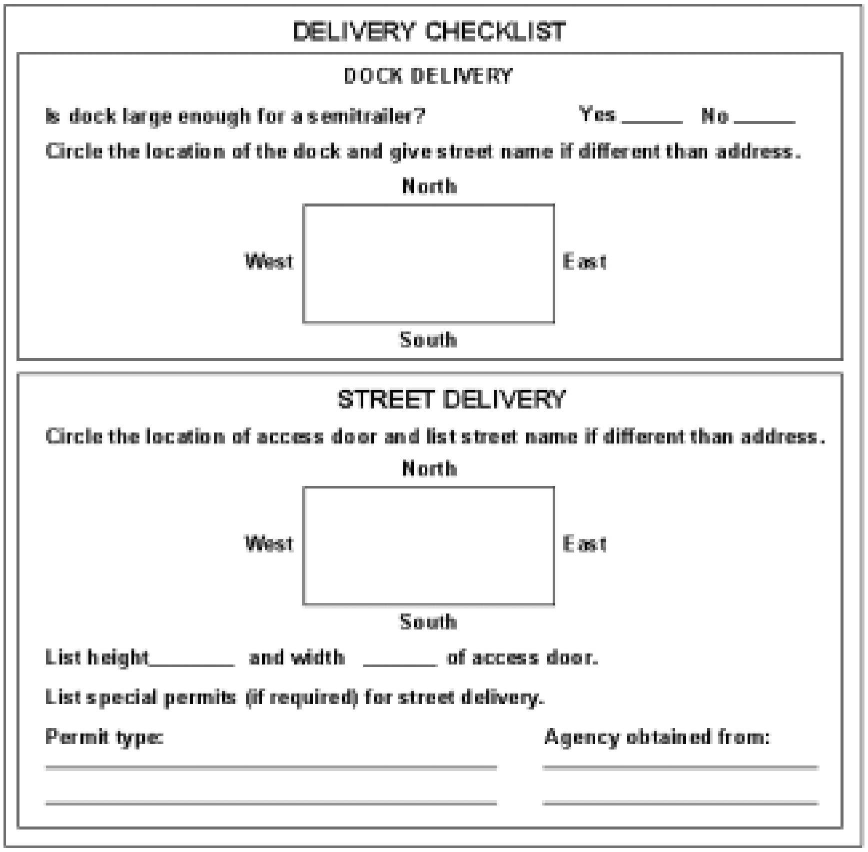
The delivery survey form shown in Figure 5-18 on page 169 and Figure 5-19 on page 170 lists delivery or installation requirements. If any of the items on the list apply, enter the appropriate information in the areas provided on the form.

Special instructions or recommendations should be entered on the Special Instructions or Recommendations form. Following are examples of special instructions or issues:

- Packaging restrictions at the facility, such as size and weight limitations
- Special delivery procedures
- Special equipment required for installation, such as tracking or hoists
- What time the facility is available for installation (after the equipment is unloaded)

- Special security requirements applicable to the facility, such as security clearance

Figure 5-18 Delivery Survey (Part 1)



DELIVERY CHECKLIST

DOCK DELIVERY

Is dock large enough for a semitrailer? Yes _____ No _____

Circle the location of the dock and give street name if different than address.

North

West East

South

STREET DELIVERY

Circle the location of access door and list street name if different than address.

North

West East

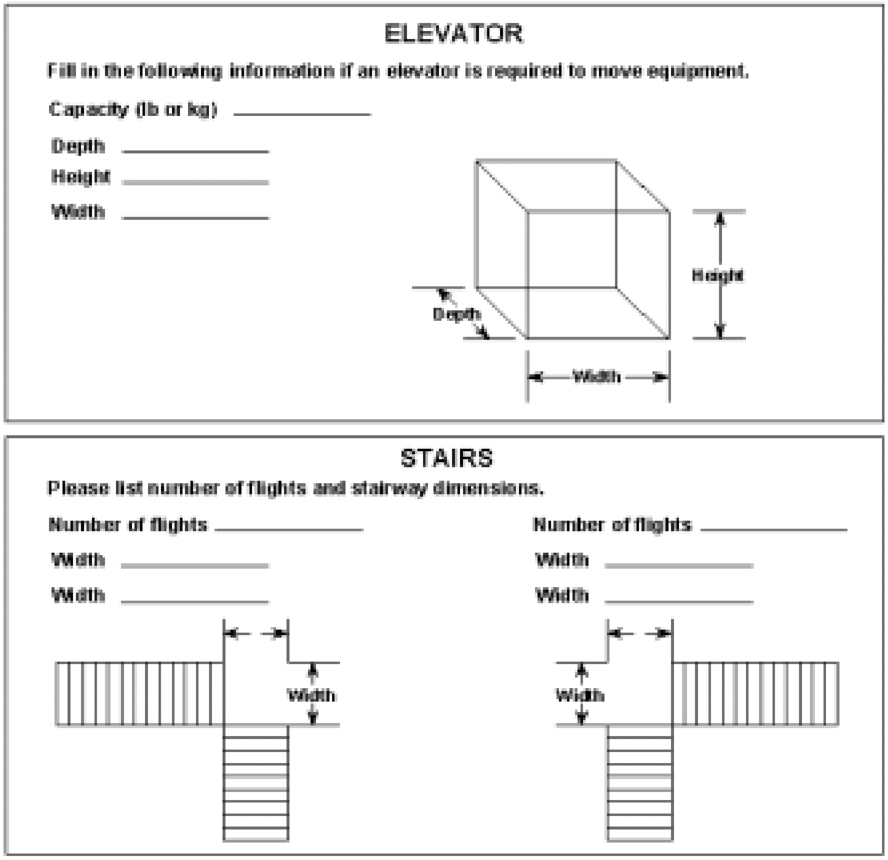
South

List height_______ and width _______ of access door.

List special permits (if required) for street delivery.

Permit type: Agency obtained from:

Figure 5-19 Delivery Survey (Part 2)


ELEVATOR

Fill in the following information if an elevator is required to move equipment.

Capacity (lb or kg) ____________

Depth ____________

Height ____________

Width ____________

STAIRS

Please list number of flights and stairway dimensions.

Number of flights ____________

Width ____________

Width ____________

Number of flights ____________

Width ____________

Width ____________

A Operating System Boot and Shutdown

This appendix covers procedures for booting an operating system (OS) on an nPartition (hardware partition) and procedures for shutting down the OS.

Operating Systems Supported on HP nPartition-capable Servers

HP supports nPartitions on HP 9000 servers and HP Integrity servers. The following list describes the operating systems supported on the different nPartition-capable models.

- HP 9000 servers have PA-RISC processors and including the following nPartition-capable models:
  - HP 9000 Superdome (SD16A, SD32A, and SD64A models)
  - HP rp8420, rp8400
  - HP rp7420, rp7405/rp7410

  See “Booting HP-UX” on page 176 for details on booting an OS on these servers.

  These HP 9000 servers run HP-UX 11i Version 1 (B.11.11). These HP 9000 servers also run the September 2004 or later release of HP-UX 11i Version 2 (B.11.23). Releases of HP-UX B.11.23 prior to September 2004 do not support HP 9000 servers.

- HP Integrity servers have Intel® Itanium® 2 processors and include the following nPartition-capable models:
  - HP Integrity Superdome (SD16A, SD32A, and SD64A models)
  - HP rx8620
  - HP rx7620

  These HP Integrity servers run the following OSes:
  - HP-UX 11i Version 2 (B.11.23) — See “Booting HP-UX” on page 176 for details.
  - Microsoft® Windows® Server 2003 — See “Booting the Microsoft Windows Operating System” on page 187 for details.
  - Red Hat Enterprise Linux 3 Update 2 and Red Hat Enterprise Linux 3 Update 3 — See “Booting the Red Hat Linux Operating System” on page 189 for details.
  - SuSE Linux Enterprise Server 9 — See “Booting the SuSE Linux Enterprise Server Operating System” on page 191 for details.

System Boot Configuration Options

This section briefly discusses the system boot options you can configure on nPartition-capable servers. You can configure boot options that are specific to each nPartition in the server complex.

HP 9000 Boot Configuration Options

On nPartition-capable HP 9000 servers the configurable system boot options include boot device paths (*PRI*, *HAA*, and *ALT*) and the autoboot setting for the nPartition. To set these options from HP-UX use the *setboot* command. From the BCH system boot environment, use the *PATH* command at the BCH Main menu to set boot device paths, and use the *PATHFLAGS* command at the BCH Configuration menu to set autoboot options. For details issue *HELP command* at the appropriate BCH menu, where *command* is the command for which you want help.

HP Integrity Boot Configuration Options

On nPartition-capable HP Integrity servers you must properly specify the ACPI configuration value, which affects the OS startup process and on some servers can affect the shutdown behavior. You also can configure boot device paths and the autoboot setting for the nPartition. Details are given in the following list.

- **Boot Options List—HP Integrity Server Boot Device Paths**

  You can manage the boot options list for each nPartition either by using the *bcfg* command at the EFI Shell, or by using the **Add a Boot Option**, **Delete Boot Option(s)**, and **Change Boot Order** menu items at the EFI **Boot Option Maintenance menu**.

  To set boot options from HP-UX use the *setboot* command.

- **Autoboot Setting**

  You can configure the autoboot setting for each nPartition either by using the *autoboot* command at the EFI Shell, or by using the **Set Auto Boot TimeOut** menu item at the EFI **Boot Option Maintenance menu**.

  To set autoboot from HP-UX use the *setboot* command.

- **ACPI Configuration Value—HP Integrity Server OS Boot**

  On nPartition-capable HP Integrity servers you must set the proper ACPI configuration for the OS that will be booted on the nPartition.

  To check the ACPI configuration value, issue the *acpiconfig* command with no arguments at the EFI Shell.

  To set the ACPI configuration value, issue the *acpiconfig value* command at the EFI Shell, where *value* is either *default*, *windows*, or *single-pci-domain*. Then reset the nPartition by issuing the *reset* EFI Shell command for the setting to take effect.

  The ACPI configuration settings for the supported operating systems are in the following list.

  — **HP-UX ACPI Configuration: default**

    On nPartition-capable HP Integrity servers, to boot or install the HP-UX operating system an nPartition must have its ACPI configuration value set to *default*.

    For details see “ACPI Configuration for HP-UX Must Be “default”” on page 176.

— **Windows ACPI Configuration: windows**

On nPartition-capable HP Integrity servers, to boot or install the Windows operating system an nPartition must have its ACPI configuration value set to *windows*.

For details see "ACPI Configuration for Windows Must Be "windows"" on page 187.

— **Red Hat Linux 3 ACPI Configuration: single-pci-domain**

On nPartition-capable HP Integrity servers, to boot or install the Red Hat Linux 3 operating system an nPartition must have its ACPI configuration value set to *single-pci-domain*.

For details see "ACPI Configuration for Red Hat Linux 3 Must Be "single-pci-domain"" on page 189.

— **SuSE Linux Enterprise Server ACPI Configuration: default**

On nPartition-capable HP Integrity servers, to boot or install the SuSE Linux Enterprise Server operating system an nPartition must have its ACPI configuration value set to *default*.

For details see "ACPI Configuration for SuSE Linux Enterprise Server Must Be "default"" on page 191.

- **ACPI "Softpowerdown" Configuration—rx7620 and rx8620 OS Shutdown Behavior**

On HP rx7620 servers and rx8620 servers you can configure the nPartition behavior when an OS is shutdown and halted. The two options are to have hardware power off when the OS is halted, or to have the nPartition be made inactive (all cells are in a boot-is-blocked state). The normal OS shutdown behavior on rx7620 servers and rx8620 servers depends on the ACPI configuration for the nPartition.

You can run the *acpiconfig* command with no arguments to check the current ACPI configuration setting; however, softpowerdown information is displayed only when different from normal behavior.

To change the nPartition behavior when an OS is shutdown and halted use either the *acpiconfig enable softpowerdown* EFI Shell command or the *acpiconfig disable softpowerdown* command and then reset the nPartition to make the ACPI configuration change take effect.

— **acpiconfig enable softpowerdown**

When set, *acpiconfig enable softpowerdown* causes nPartition hardware to be powered off when the operating system issues a shutdown for reconfig command (for example, *shutdown -h* or *shutdown /s*).

This is the normal behavior on rx8620 and rx7620 servers with a *windows* ACPI configuration setting.

When softpowerdown is enabled on an rx7620 or rx8620 server, if one nPartition is defined in the server then halting the operating system powers off the server cabinet (including all cells and I/O chassis). On an rx7620 or rx8620 server with multiple nPartitions, halting the operating system from an nPartition with softpowerdown enabled causes only the resources on the local nPartition to be powered off.

To power on hardware that has been powered off, use the *PE* command at the management processor command menu.

— **acpiconfig disable softpowerdown**

When set, *acpiconfig disable softpowerdown* causes nPartition cells to remain at a boot-is-blocked state when the operating system issues a shutdown for reconfig command (for example, *shutdown -h* or *shutdown /s*). In this case an OS shutdown for reconfig makes the nPartition inactive.

This is the normal behavior on rx8620 and rx7620 servers with an ACPI configuration setting of *default* or *single-pci-domain*.

To make an inactive nPartition active, use the management processor *BO* command to boot the nPartition past the boot-is-blocked state.

Booting HP-UX

This section covers the following methods of booting HP-UX:

- HP-UX Booting — The standard ways to boot HP-UX. Typically this results in booting HP-UX in multi-user mode.
- Single-User Mode HP-UX Booting — How to boot HP-UX in single-user mode.
- LVM-Maintenance Mode HP-UX Booting — How to boot HP-UX in LVM-maintenance mode.

See “Shutting Down HP-UX” on page 193 for details on shutting down the HP-UX operating system.

CAUTION **ACPI Configuration for HP-UX Must Be “default”**

On nPartition-capable HP Integrity servers, to boot the HP-UX operating system an nPartition must have its ACPI configuration value set to *`default`*.

At the EFI Shell interface, enter the *`acpiconfig`* command with no arguments to list the current ACPI configuration. If the *`acpiconfig`* value is not set to *`default`*, then HP-UX cannot boot; in this situation you must reconfigure *`acpiconfig`* or else booting will be interrupted with a panic when launching the HP-UX kernel.

To set the ACPI configuration for HP-UX: at the EFI Shell interface enter the *`acpiconfig default`* command, and then enter the *`reset`* command for the nPartition to reboot with the proper (*`default`*) configuration for HP-UX.

HP-UX Booting

You can boot HP-UX by using any one of the following procedures:

- "HP-UX Booting [BCH Menu]" on page 177

  The BCH system boot environment is provided on HP 9000 servers.

- "HP-UX Booting [EFI Boot Manager]" on page 179

  The EFI system boot environment is provided on HP Integrity servers.

- "HP-UX Booting [EFI Shell]" on page 180

  The EFI system boot environment is provided on HP Integrity servers.

HP-UX Booting [BCH Menu]

From the BCH Menu, use the *BOOT* command to boot the HP-UX operating system. The BCH Menu is available only on HP 9000 servers.

Step 1. Access the BCH Main Menu for the nPartition on which you want to boot HP-UX.

Login to the service processor (MP or GSP) and enter *CO* to access the Console list. Select the nPartition console. When accessing the console, confirm that you are at the BCH Main Menu (the *Main Menu: Enter command or menu>* prompt). If at a BCH menu other than the Main Menu, then enter *MA* to return to the BCH Main Menu.

Step 2. Choose which device you wish to boot.

From the BCH Main menu, use the *PATH* command to list any boot path variable settings. The primary (PRI) boot path normally is set to the main boot device for the nPartition. You also can use the *SEARCH* command to find and list potentially bootable devices for the nPartition.

```
Main Menu: Enter command or menu > PATH

     Primary Boot Path:  0/0/2/0/0.13
                         0/0/2/0/0.d    (hex)

HA Alternate Boot Path:  0/0/2/0/0.14
                         0/0/2/0/0.e    (hex)

   Alternate Boot Path:  0/0/2/0/0.0
                         0/0/2/0/0.0    (hex)

Main Menu: Enter command or menu >
```

Step 3. Boot the device using the ***BOOT*** command from the BCH interface.

You can issue the *BOOT* command in any of the following ways:

- ***BOOT***

  Issuing the *BOOT* command with no arguments boots the device at the primary (PRI) boot path.

- ***BOOT bootvariable***

  This command boots the device indicated by the specified boot path, where *bootvariable* is the PRI, HAA, or ALT boot path.

  For example, *BOOT PRI* boots the primary boot path.

- ***BOOT LAN INSTALL*** or ***BOOT LAN.ip-address INSTALL***

The *BOOT... INSTALL* commands boot HP-UX from the default HP-UX install server or from the server specified by *ip-address*.

- ***BOOT path***

  This command boots the device at the specified *path*. You can specify the *path* in HP-UX hardware path notation (for example, 0/0/2/0/0.13) or in “path label” format (for example, P0 or P1) .

  If you specify the *path* in “path label” format then *path* refers to a device path reported by the last *SEARCH* command.

After you issue the *BOOT* command, the BCH interface prompts you to specify whether you want to stop at the ISL prompt.

To boot the /stand/vmunix HP-UX kernel from the device without stopping at the ISL prompt, enter ***n*** to automatically proceed past ISL and execute the contents of the AUTO file on the selected device. (By default the AUTO file is configured to load /stand/vmunix.)

```
Main Menu: Enter command or menu > BOOT PRI

     Primary Boot Path:  0/0/1/0/0.15


 Do you wish to stop at the ISL prompt prior to booting? (y/n) >> n


ISL booting  hpux

Boot
: disk(0/0/1/0/0.15.0.0.0.0.0;0)/stand/vmunix
```

To boot an HP-UX kernel other than */stand/vmunix*, or to boot HP-UX in single-user or LVM-maintenance mode, stop at the ISL prompt and specify the appropriate arguments to the *hpux* loader.

Step 4. Exit the console and service processor interfaces if finished using them.

To exit the BCH environment type **^B** (**Control-B**); this exits the nPartition console and returns to the service processor Main Menu. To exit the service processor, type *X* at the Main Menu.

HP-UX Booting [EFI Boot Manager]

From the EFI Boot Manager menu, select an item from the boot options list to boot HP-UX using the selected boot option. The EFI Boot Manager is available only on HP Integrity servers.

See “ACPI Configuration for HP-UX Must Be “default”” on page 176 for required configuration details.

Step 1. Access the EFI Boot Manager menu for the nPartition on which you want to boot HP-UX.

Login to the service processor (MP or GSP) and enter *CO* to access the Console list. Select the nPartition console.

When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If at another EFI menu, select the **Exit** option from the sub-menus until you return to the screen with the *EFI Boot Manager* heading.

Step 2. At the EFI Boot Manager menu, select an item from the boot options list.

Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to be used when booting the device.

Step 3. Press **Return** or **Enter** to initiate booting using the selected boot option.

Step 4. Exit the console and service processor interfaces if finished using them.

To exit the EFI environment type **^B** (**Control-B**); this exits the nPartition console and returns to the service processor Main Menu. To exit the service processor, type *X* at the Main Menu.

HP-UX Booting [EFI Shell]

From the EFI Shell environment, to boot HP-UX on a device first access the EFI System Partition (for example *fs0:*) for the root device and then enter ***HPUX*** to invoke the loader. The EFI Shell is available only on HP Integrity servers.

See “ACPI Configuration for HP-UX Must Be “default”” on page 176 for required configuration details.

Step 1. Access the EFI Shell environment for the nPartition on which you want to boot HP-UX.

Login to the service processor (MP or GSP) and enter *CO* to access the Console list. Select the nPartition console.

When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If at another EFI menu, select the **Exit** option from the sub-menus until you return to the screen with the *EFI Boot Manager* heading.

From the EFI Boot Manager menu, select the **EFI Shell** menu option to access the EFI Shell environment.

Step 2. At the EFI Shell environment, issue the *acpiconfig* command to list the current ACPI configuration for the local nPartition.

On nPartition-capable HP Integrity servers, to boot the HP-UX operating system an nPartition must have its ACPI configuration value set to *default*. If the *acpiconfig* value is not set to *default*, then HP-UX cannot boot; in this situation you must reconfigure *acpiconfig* or else booting will be interrupted with a panic when launching the HP-UX kernel.

To set the ACPI configuration for HP-UX: at the EFI Shell interface enter the *acpiconfig default* command, and then enter the *reset* command for the nPartition to reboot with the proper (*default*) configuration for HP-UX.

Step 3. At the EFI Shell environment, issue the *map* command to list all currently mapped bootable devices.

The bootable filesystems of interest typically are listed as *fs0:*, *fs1:*, and so on.

Step 4. Access the EFI System Partition (*fsX:* where *X* is the filesystem number) for the device from which you want to boot HP-UX.

For example, enter *fs2:* to access the EFI System Partition for the bootable filesystem number *2*. Note that the EFI Shell prompt changes to reflect the filesystem currently accessed.

Also note that the filesystem number may change each time it is mapped (for example, when the nPartition boots, or when the *map -r* command is issued).

Step 5. When accessing the EFI System Partition for the desired boot device, issue the *HPUX* command to invoke the *HPUX.EFI* loader on the selected devive.

The full path for the loader is *\EFI\HPUX\HPUX.EFI* and when invoked it references the *\EFI\HPUX\AUTO* file and proceeds to boot HP-UX using the default boot behavior specified in the *AUTO* file.

You are given ten seconds to interrupt the automatic booting of the default boot behavior. Typing a key during this ten-second period stops the HP-UX boot process and enables you to interact with the *HPUX.EFI* loader. To exit the loader (the *HPUX>* prompt) type *exit* to return to the EFI Shell.

To boot the HP-UX operating system, do not type anything during the ten-second period given for stopping at the *HPUX.EFI* loader.

```
Shell> map
Device mapping table
  fs0  : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part1,Sig72550000)
  blk0 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)
  blk1 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part1,Sig72550000)
  blk2 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part2,Sig72550000)
  blk3 : Acpi(000222F0,2A8)/Pci(0|0)/Scsi(Pun8,Lun0)
  blk4 : Acpi(000222F0,2A8)/Pci(0|1)/Scsi(Pun2,Lun0)

Shell> fs0:

fs0:\> hpux

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HP-UX Boot Loader for IA64  Revision 1.723

Press Any Key to interrupt Autoboot
\efi\hpux\AUTO ==> boot vmunix
Seconds left till autoboot -   9
```

Step 6. Exit the console and service processor interfaces if finished using them.

To exit the EFI environment type **^B** (**Control-B**); this exits the nPartition console and returns to the service processor Main Menu. To exit the service processor, type *X* at the Main Menu.

Single-User Mode HP-UX Booting

You can boot HP-UX in single-user mode by using any one of the following procedures:

- "Single-User Mode HP-UX Booting [BCH Menu]" on page 182
- "Single-User Mode HP-UX Booting [EFI Shell]" on page 183

Single-User Mode HP-UX Booting [BCH Menu]

From the BCH Menu, you can boot HP-UX in single-user mode by issuing the ***BOOT*** command, stopping at the ISL interface, and issuing *hpux* loader options. The BCH Menu is available only on HP 9000 servers.

Step 1. Access the BCH Main Menu for the nPartition on which you want to boot HP-UX in single-user mode.

Login to the service processor (MP or GSP) and enter *CO* to access the Console list. Select the nPartition console. When accessing the console, confirm that you are at the BCH Main Menu (the *Main Menu: Enter command or menu>* prompt). If at a BCH menu other than the Main Menu, then enter *MA* to return to the BCH Main Menu.

Step 2. Boot the desired device using the ***BOOT*** command at the BCH interface, and specify that the nPartition stop at the ISL prompt prior to booting (reply ***y*** to the "stop at the ISL prompt" question).

```
Main Menu: Enter command or menu > BOOT 0/0/2/0/0.13

 BCH Directed Boot Path: 0/0/2/0/0.13


 Do you wish to stop at the ISL prompt prior to booting? (y/n) >> y

Initializing boot Device.

....

ISL Revision A.00.42  JUN 19, 1999

ISL>
```

Step 3. From the ISL prompt, issue the appropriate Secondary System Loader (*hpux*) command to boot the HP-UX kernel in the desired mode.

Use the *hpux* loader to specify the boot mode options and to specify which kernel (such as: /stand/vmunix) to boot on the nPartition.

- To boot HP-UX in single-user mode:

  ISL> ***hpux -is boot /stand/vmunix***

- To boot HP-UX at the default run level:

  ISL> ***hpux boot /stand/vmunix***

To exit the ISL prompt and return to the BCH interface, issue the *EXIT* command instead of specifying one of the above *hpux* loader commands.

Refer to the *hpux* (1M) manpage for a detailed list of *hpux* loader options.

Example A-1Example Single-User HP-UX Boot

```
ISL Revision A.00.42  JUN 19, 1999

ISL> hpux -is /stand/vmunix

Boot
: disk(0/0/2/0/0.13.0.0.0.0.0;0)/stand/vmunix
8241152 + 1736704 + 1402336 start 0x21a0e8

....

INIT: Overriding default level with level ’s’

INIT: SINGLE USER MODE

INIT: Running /sbin/sh
#
```

Step 4. Exit the console and service processor interfaces if finished using them.

To exit the BCH environment type **^B** (**Control-B**); this exits the nPartition console and returns to the service processor Main Menu. To exit the service processor, type *X* at the Main Menu.

Single-User Mode HP-UX Booting [EFI Shell]

From the EFI Shell environment, boot in single-user mode by stopping the boot process at the *HPUX.EFI* interface (the HP-UX Boot Loader prompt, *HPUX>*) entering the *boot -is vmunix* command. The EFI Shell is available only on HP Integrity servers.

See “ACPI Configuration for HP-UX Must Be “default”” on page 176 for required configuration details.

Step 1. Access the EFI Shell environment for the nPartition on which you want to boot HP-UX in single-user mode.

Login to the service processor (MP or GSP) and enter *CO* to access the Console list. Select the nPartition console.

When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If at another EFI menu, select the **Exit** option from the sub-menus until you return to the screen with the *EFI Boot Manager* heading.

From the EFI Boot Manager menu, select the **EFI Shell** menu option to access the EFI Shell environment.

Step 2. Access the EFI System Partition (*fsX:* where *X* is the filesystem number) for the device from which you want to boot HP-UX.

Step 3. When accessing the EFI System Partition for the desired boot device, issue the *HPUX* command to invoke the *\EFI\HPUX\HPUX.EFI* loader on the selected devive.

Step 4. Boot to the HP-UX Boot Loader prompt (*HPUX>*) by typing any key within the ten seconds given for interrupting the HP-UX boot process. You will use the *HPUX.EFI* loader to boot HP-UX in single-user mode in the next step.

After you type a key, the *HPUX.EFI* interface (the HP-UX Boot Loader prompt, *HPUX>*) is provided. For help using the *HPUX.EFI* loader, type the *help* command. To return to the EFI Shell, type *exit*.

```
fs0:\> hpux

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HP-UX Boot Loader for IA64  Revision 1.723

Press Any Key to interrupt Autoboot
\efi\hpux\AUTO ==> boot vmunix
Seconds left till autoboot -   9
```

[User Types A Key to Stop the HP-UX Boot Process and Access the HPUX.EFI Loader]

```
   Type 'help' for help

HPUX>
```

Step 5. At the *HPUX.EFI* interface (the HP-UX Boot Loader prompt, *HPUX>*) enter the *boot -is vmunix* command to boot HP-UX (the */stand/vmunix* kernel) in single-user (*-is*) mode.

```
HPUX> boot -is vmunix
> System Memory = 4063 MB
loading section 0
.................................................... (complete)
loading section 1
........ (complete)
loading symbol table
loading System Directory(boot.sys) to MFS
....
loading MFSFILES Directory(bootfs) to MFS
......
Launching /stand/vmunix
SIZE: Text:25953K + Data:3715K + BSS:3637K = Total:33306K

Console is on a Serial Device
Booting kernel...
```

Step 6. Exit the console and service processor interfaces if finished using them.

To exit the EFI environment type **^B** (**Control-B**); this exits the nPartition console and returns to the service processor Main Menu. To exit the service processor, type *X* at the Main Menu.

LVM-Maintenance Mode HP-UX Booting

You can boot HP-UX in LVM-maintenance mode by using any one of the following procedures:

- "LVM-Maintenance Mode HP-UX Booting [BCH Menu]" on page 185
- "LVM-Maintenance Mode HP-UX Booting [EFI Shell]" on page 185

LVM-Maintenance Mode HP-UX Booting [BCH Menu]

From the BCH Menu, you can boot HP-UX in LVM-maintenance mode by issuing the ***BOOT*** command, stopping at the ISL interface, and issuing *hpux* loader options. The BCH Menu is available only on HP 9000 servers.

Step 1. Access the BCH Main Menu for the nPartition on which you want to boot HP-UX in LVM-maintenance mode.

Login to the service processor (MP or GSP) and enter *CO* to access the Console list. Select the nPartition console. When accessing the console, confirm that you are at the BCH Main Menu (the *Main Menu: Enter command or menu>* prompt). If at a BCH menu other than the Main Menu, then enter *MA* to return to the BCH Main Menu.

Step 2. Boot the desired device using the ***BOOT*** command at the BCH interface, and specify that the nPartition stop at the ISL prompt prior to booting (reply ***y*** to the "stop at the ISL prompt" question).

Step 3. From the ISL prompt, issue the appropriate Secondary System Loader (*hpux*) command to boot the HP-UX kernel in the desired mode.

To boot HP-UX in LVM-maintenance mode:

ISL> ***hpux -lm boot /stand/vmunix***

Step 4. Exit the console and service processor interfaces if finished using them.

To exit the BCH environment type **^B** (**Control-B**); this exits the nPartition console and returns to the service processor Main Menu. To exit the service processor, type *X* at the Main Menu.

LVM-Maintenance Mode HP-UX Booting [EFI Shell]

From the EFI Shell environment, boot in LVM-maintenance mode by stopping the boot process at the *HPUX.EFI* interface (the HP-UX Boot Loader prompt, *HPUX>*) entering the *boot -lm vmunix* command. The EFI Shell is available only on HP Integrity servers.

See "ACPI Configuration for HP-UX Must Be "default"" on page 176 for required configuration details.

Step 1. Access the EFI Shell environment for the nPartition on which you want to boot HP-UX in LVM-maintenance mode.

Login to the service processor (MP or GSP) and enter *CO* to access the Console list. Select the nPartition console.

When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If at another EFI menu, select the **Exit** option from the sub-menus until you return to the screen with the *EFI Boot Manager* heading.

From the EFI Boot Manager menu, select the **EFI Shell** menu option to access the EFI Shell environment.

Step 2. Access the EFI System Partition (*fsX:* where *X* is the filesystem number) for the device from which you want to boot HP-UX.

Step 3. When accessing the EFI System Partition for the desired boot device, issue the *HPUX* command to invoke the *\EFI\HPUX\HPUX.EFI* loader on the selected device.

Step 4. Type any key within the ten seconds given for interrupting the HP-UX boot process. This stops the boot process at the *HPUX.EFI* interface (the HP-UX Boot Loader prompt, *HPUX>*).

Step 5. At the *HPUX.EFI* interface, enter the ***boot -lm vmunix*** command to boot HP-UX (the */stand/vmunix* kernel) in LVM-maintenance (-*lm*) mode.

Step 6. Exit the console and service processor interfaces if finished using them.

To exit the EFI environment type **^B** (**Control-B**); this exits the nPartition console and returns to the service processor Main Menu. To exit the service processor, type *X* at the Main Menu.

Booting the Microsoft Windows Operating System

You can boot the Windows Server 2003 operating system on an HP Integrity server by using the EFI Boot Manager to select the appropriate Windows item from the boot options list.

See "Shutting Down Microsoft Windows" on page 195 for details on shutting down the Windows operating system.

CAUTION **ACPI Configuration for Windows Must Be "windows"**

On nPartition-capable HP Integrity servers, to boot the Windows operating system an nPartition must have its ACPI configuration value set to *`windows`*.

At the EFI Shell, enter the *`acpiconfig`* command with no arguments to list the current ACPI configuration. If the *`acpiconfig`* value is not set to *`windows`*, then Windows cannot boot; in this situation you must reconfigure *`acpiconfig`* or else booting will be interrupted with a panic when launching Windows.

To set the ACPI configuration for Windows: at the EFI Shell enter the *`acpiconfig windows`* command, and then enter the *`reset`* command for the nPartition to reboot with the proper (*`windows`*) configuration for Windows.

NOTE **Microsoft Windows Booting on HP Integrity Servers**

The recommended method for booting Windows is to use the EFI Boot Manager menu to select a Windows entry from the boot options list. Using the *`ia64ldr.efi`* Windows loader from the EFI Shell is not recommended.

Windows Booting

From the EFI Boot Manager menu, select an item from the boot options list to boot Windows using the selected boot option. The EFI Boot Manager is available only on HP Integrity servers.

See “ACPI Configuration for Windows Must Be “windows”” on page 187 for required configuration details.

Step 1. Access the EFI Boot Manager menu for the system on which you want to boot Windows.

Login to the management processor and enter *CO* to access the Console list. Select the nPartition console.

When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If at another EFI menu, select the **Exit** option from the sub-menus until you return to the screen with the *EFI Boot Manager* heading.

Step 2. At the EFI Boot Manager menu, select an item from the boot options list.

Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to be used when booting the device.

Step 3. Press **Return** or **Enter** to initiate booting using the selected boot option.

Step 4. Once Windows begins loading, wait for the Special Administration Console (SAC) to become available.

The SAC interface provides a text-based administration tool that is available from the nPartition console. For details see the SAC online help (type *?* at the *SAC>* prompt).

```
Loading.: Windows Server 2003, Datacenter
Starting: Windows Server 2003, Datacenter


                                 Starting Windows...
********************************************************************************

Computer is booting, SAC started and initialized.

Use the "ch -?" command for information about using channels.
Use the "?" command for general help.

SAC>
```

Step 5. Exit the console and management processor interfaces if finished using them.

To exit the console environment type **^B** (**Control-B**); this exits the console and returns to the management processor Main menu. To exit the management processor, type *X* at the Main menu.

Booting the Red Hat Linux Operating System

You can boot the Red Hat Linux operating system on HP Integrity servers using either of the methods described in this section.

See "Shutting Down Linux" on page 197 for details on shutting down the Red Hat Linux operating system.

CAUTION **ACPI Configuration for Red Hat Linux 3 Must Be "single-pci-domain"**

On nPartition-capable HP Integrity servers, to boot the Red Hat Linux 3 operating system an nPartition must have its ACPI configuration value set to *single-pci-domain*.

At the EFI Shell, enter the *acpiconfig* command with no arguments to list the current ACPI configuration. If the *acpiconfig* value is not set to *single-pci-domain*, then Red Hat Linux could panic; in this situation you must reconfigure *acpiconfig* to eliminate any bus address conflicts and ensure all I/O slots have unique addresses.

To set the ACPI configuration for Red Hat Linux 3: at the EFI Shell enter the *acpiconfig single-pci-domain* command, and then enter the *reset* command for the nPartition to reboot with the proper (*single-pci-domain*) configuration for Red Hat Linux 3.

Use either of these methods to boot Red Hat Linux:

- Select a Red Hat Linux entry from the EFI Boot Manager menu.

  To load the Red Hat Linux operating system at the EFI Boot Manager menu, select its entry from the list of boot options.

  Selecting a Linux entry from the boot options list boots the operating system using *ELILO.EFI* loader and the *elilo.conf* file.

- Invoke the *ELILO.EFI* Linux loader from the EFI Shell.

  See the procedure "Red Hat Linux Operating System Booting from the EFI Shell" on page 190 for details.

  On a Red Hat Linux boot device EFI System Partition, the full paths to the loader and configuration files are:
  \EFI\redhat\elilo.efi
  \EFI\redhat\elilo.conf

  After selecting the filesystem for the boot device (for example, *fs0:*) you can invoke the Linux loader from the EFI Shell prompt by entering the full path for the *ELILO.EFI* loader.

By default the *ELILO.EFI* loader boots Linux using the kernel image and parameters specified by the default entry in the *elilo.conf* file on the EFI System Partition for the boot device.

To interact with the *ELILO.EFI* loader, interrupt the boot process (for example, type a space) at the *ELILO boot* prompt. To exit the *ELILO.EFI* loader use the *exit* command.

Red Hat Linux Operating System Booting from the EFI Shell

Use this procedure to boot Red Hat Linux from the EFI Shell.

See “ACPI Configuration for Red Hat Linux 3 Must Be “single-pci-domain”” on page 189 for required configuration details.

Step 1. Access the EFI Shell.

From the system console, select the **EFI Shell** entry from the EFI Boot Manager menu to access the shell.

Step 2. Access the EFI System Partition for the Red Hat Linux boot device.

Use the *map* EFI Shell command to list the filesystems (*fs0*, *fs1*, and so on) that are known and have been mapped.

To select a filesystem to use, enter its mapped name followed by a colon (**:**). For example, to operate with the boot device that is mapped as *fs3*, enter ***fs3:*** at the EFI Shell prompt.

Step 3. Enter ***ELILO*** at the EFI Shell command prompt to launch the *ELILO.EFI* loader.

If needed, you can specify the loader’s full path by entering ***\EFI\redhat\elilo*** at the EFI Shell command prompt.

Step 4. Allow the *ELILO.EFI* loader to proceed with booting the Red Hat Linux kernel.

By default, the *ELILO.EFI* loader boots the kernel image and options specified by the default item in the *elilo.conf* file.

To interact with the *ELILO.EFI* loader, interrupt the boot process (for example, type a space) at the *ELILO boot* prompt. To exit the loader use the *exit* command.

Booting the SuSE Linux Enterprise Server Operating System

You can boot the SuSE Linux Enterprise Server 9 operating system on HP Integrity servers using either of the methods described in this section.

See "Shutting Down Linux" on page 197 for details on shutting down the SuSE Linux Enterprise Server operating system.

CAUTION **ACPI Configuration for SuSE Linux Enterprise Server Must Be "default"**

On nPartition-capable HP Integrity servers, to boot the SuSE Linux Enterprise Server operating system an nPartition must have its ACPI configuration value set to *default*.

At the EFI Shell, enter the *acpiconfig* command with no arguments to list the current ACPI configuration. If the *acpiconfig* value is not set to *default*, then SuSE Linux Enterprise Server could panic.

To set the ACPI configuration for SuSE Linux Enterprise Server: at the EFI Shell enter the *acpiconfig default* command, and then enter the *reset* command for the nPartition to reboot with the proper (*default*) configuration for SuSE Linux Enterprise Server.

Use either of these methods to boot SuSE Linux Enterprise Server:

- Select a SuSE Linux Enterprise Server entry from the EFI Boot Manager menu.

  To load the SuSE Linux Enterprise Server operating system at the EFI Boot Manager menu, select its entry from the list of boot options.

  Selecting a Linux entry from the boot options list boots the operating system using *ELILO.EFI* loader and the *elilo.conf* file.

- Invoke the *ELILO.EFI* Linux loader from the EFI Shell.

  See the procedure "SuSE Linux Enterprise Server Operating System Booting from the EFI Shell" on page 192 for details.

  On a SuSE Linux Enterprise Server boot device EFI System Partition, the full paths to the loader and configuration files are:
  \efi\SuSE\elilo.efi
  \efi\SuSE\elilo.conf

  After selecting the filesystem for the boot device (for example, *fs0:*) you can invoke the Linux loader from the EFI Shell prompt by entering the full path for the *ELILO.EFI* loader.

By default the *ELILO.EFI* loader boots Linux using the kernel image and parameters specified by the default entry in the *elilo.conf* file on the EFI System Partition for the boot device.

To interact with the *ELILO.EFI* loader, interrupt the boot process (for example, type a space) at the *ELILO boot* prompt. To exit the *ELILO.EFI* loader use the *exit* command.

SuSE Linux Enterprise Server Operating System Booting from the EFI Shell

Use this procedure to boot SuSE Linux Enterprise Server 9 from the EFI Shell.

See "ACPI Configuration for SuSE Linux Enterprise Server Must Be "default"" on page 191 for required configuration details.

Step 1. Access the EFI Shell.

From the system console, select the **EFI Shell** entry from the EFI Boot Manager menu to access the shell.

Step 2. Access the EFI System Partition for the SuSE Linux Enterprise Server boot device.

Use the *map* EFI Shell command to list the filesystems (*fs0*, *fs1*, and so on) that are known and have been mapped.

To select a filesystem to use, enter its mapped name followed by a colon (**:**). For example, to operate with the boot device that is mapped as *fs3*, enter ***fs3:*** at the EFI Shell prompt.

Step 3. Enter ***ELILO*** at the EFI Shell command prompt to launch the *ELILO.EFI* loader.

If needed, you can specify the loader's full path by entering ***\efi\SuSE\elilo*** at the EFI Shell command prompt.

Step 4. Allow the *ELILO.EFI* loader to proceed with booting the Red Hat Linux kernel.

By default, the *ELILO.EFI* loader boots the kernel image and options specified by the default item in the *elilo.conf* file.

To interact with the *ELILO.EFI* loader, interrupt the boot process (for example, type a space) at the *ELILO boot* prompt. To exit the loader use the *exit* command.

Shutting Down HP-UX

When HP-UX is running on an nPartition, you can shut down HP-UX using the *shutdown* command.

On nPartitions you have the following options when shutting down HP-UX:

- To shut down HP-UX and reboot an nPartition: ***shutdown -r***

  On nPartition-capable HP Integrity servers, the *shutdown -r* command is equivalent to the *shutdown -R* command.

- To shut down HP-UX and halt an nPartition: ***shutdown -h***

  On nPartition-capable HP Integrity servers, the *shutdown -h* command is equivalent to the *shutdown -R -H* command.

- To perform a reboot for reconfig of an nPartition: ***shutdown -R***
- To hold an nPartition at a shutdown for reconfig state: ***shutdown -R -H***

For details refer to the *shutdown* (1M) manpage.

NOTE On HP rx7620 servers and rx8620 servers you can configure the nPartition behavior when an OS is shutdown and halted (*shutdown -h* or *shutdown -R -H*). The two options are to have hardware power off when the OS is halted, or to have the nPartition be made inactive (all cells are in a boot-is-blocked state).

The normal behavior for HP-UX shutdown and halt is for the nPartition be made inactive.

For details see "ACPI "Softpowerdown" Configuration—rx7620 and rx8620 OS Shutdown Behavior" on page 174.

Shutting Down HP-UX [*/sbin/shutdown* command]

From the HP-UX command line, issue the *shutdown* command to shut down the HP-UX operating system.

Step 1. Login to HP-UX running on the nPartition that you want to shut down.

You can login to HP-UX on the nPartition either by directly connecting (with the *telnet* or *rlogin* commands) or by logging in to the service processor (GSP or MP) for the complex where it resides and using the Console menu to access the nPartition console.

Accessing the console through the service processor allows you to maintain console access to the nPartition after HP-UX has shut down.

Step 2. Issue the ***shutdown*** command with the appropriate command-line options.

The command-line options you specify dictate the way in which HP-UX is shut down, whether the nPartition is rebooted, and whether any nPartition configuration changes (adding or removing cells) take place.

Use the following list to choose an HP-UX shut down option for your nPartition.

- Shut down HP-UX and halt the nPartition.

On HP 9000 servers only, issue the ***shutdown -h*** command to shut down and halt the nPartition. This leaves the nPartition and all its cells in an active state after HP-UX shuts down and halts.

To reboot a halted nPartition you must reset the nPartition using the *RS* command at the GSP command menu.

On nPartition-capable HP Integrity servers, the *shutdown -h* command puts an nPartition into the shutdown for reconfig state; for details see the discussion of *shutdown -R -H* in this list.

- Shut down HP-UX and reboot the nPartition.

  Issue the ***shutdown -r*** command to shut down and reboot the nPartition.

  On nPartition-capable HP Integrity servers, the *shutdown -r* command is equivalent to the *shutdown -R* command.

- Perform a reboot for reconfig of the nPartition.

  Issue the HP-UX ***shutdown -R*** command to perform a reboot for reconfig.

  This shuts down HP-UX, reconfigures the nPartition if needed, and reboots the nPartition.

- Reboot the nPartition and put it in to the shutdown for reconfig state.

  Use the HP-UX ***shutdown -R -H*** command to hold the nPartition in the shutdown for reconfig state.

  This leaves the nPartition and all its cells in an inactive state (the nPartition can be reconfigured remotely), unless the normal behavior has been modified. For details on changing OS halt behavior on rx8620 and rx7620 servers see “ACPI “Softpowerdown” Configuration—rx7620 and rx8620 OS Shutdown Behavior” on page 174.

  To reboot the nPartition you must do so manually by using the *BO* command at the service processor Command menu.

If HP-UX is halted on the nPartition, thus not allowing you to use the *shutdown* command, you can reboot or reset the nPartition by issuing commands from the service processor Command menu.

Shutting Down Microsoft Windows

You can shut down the Windows operating system on HP Integrity servers using the **Start** menu or the *shutdown* command.

CAUTION Do not shut down Windows using Special Administration Console (SAC) *restart* or *shutdown* commands under normal circumstances.

Issuing *restart* or *shutdown* at the *SAC>* prompt causes the system to restart or shutdown immediately and can result in the loss of data.

Instead use the Windows **Start** menu or the *shutdown* command to shut down gracefully.

To shut down Windows use either of the following methods.

- Select **Shut Down** from the **Start** menu and choose either **Restart** or **Shut down** from the pull-down menu.

  The **Restart** menu item shuts down and restart the system. The **Shut down** menu item shuts down the system.

  You can use this method when using a graphical interface to the system.

- Issue the *shutdown* command from the Windows command line.

  See the procedure “Windows Shutdown from the Command Line” on page 195 for details.

  You can issue this command from a command prompt through the Special Administration Console (SAC) or from any other command line.

  The Windows *shutdown* command includes the following options:

/s	Shut down the system. This is the equivalent of **Start—>Shut Down, Shut down**.
/r	Shut down and restart the system. This is the equivalent of **Start—>Shut Down, Restart**.
/a	Abort a system shutdown.
/t xxx	Set the timeout period before shutdown to *xxx* seconds. The timeout period can be 0–600, with a default of 30.

  Refer to the *help shutdown* Windows command for details.

NOTE On HP rx8620 servers and HP rx7620 servers, performing a shutdown using *shutdown /s* (or the equivalent **Start—>Shut Down, Shut down**) powers off the server cabinet or powers off the cells and I/O chassis assigned to the nPartition. On HP rx8620 servers and HP rx7620 servers this behavior can be customized. For details see “ACPI “Softpowerdown” Configuration—rx7620 and rx8620 OS Shutdown Behavior” on page 174.

On HP Integrity Superdome servers, the Windows *shutdown /s* command shuts down the system and keeps all cells at BIB (the boot is blocked, inactive state).

Windows Shutdown from the Command Line

From the Windows command line, issue the ***shutdown*** command to shut down the operating system.

Step 1. Login to Windows running on the system that you want to shut down.

For example, access the system console and use the Windows SAC interface to start a command prompt, from which you can issue Windows commands to shut down the the system.

Step 2. Check to see whether any users are logged in.

Use the *query user* or *query session* command.

Step 3. Issue the *shutdown* command and the appropriate options to shut down the Windows Server 2003 on the system.

You have the following options when shutting down Windows:

- To shut down Windows and reboot:
  shutdown /r
  or select the **Start —> Shut Down** action and choose **Restart** from the pull-down menu.
- To shut down Windows and not reboot (either power down server hardware or put an nPartition into a shutdown for reconfig state):
  shutdown /s
  or select the **Start —> Shut Down** action and choose **Shut down** from the pull-down menu.
- To abort a shutdown (stop a shutdown that has been initiated): ***shutdown /a***

For example:

shutdown /r /t 60 /c "Shut down in one minute."

This command initiates a Windows system shutdown-and-reboot after a timeout period of 60 seconds. The */c* option specifies a message that is broadcast to any other users of the system.

Shutting Down Linux

Use the *shutdown* command to shut down the Red Hat Linux or the SuSE Linux Enterprise Server operating system.

The Red Hat Linux and SuSE Linux Enterprise Server *shutdown* command includes the following options:

-h Halt after shutdown.

On nPartition-capable HP Integrity servers, this will either power down server hardware or put the nPartition into a shutdown for reconfig state.

Use the *PE* command at the management processor Command menu to manually power on or power off server hardware, as needed.

-r Reboot after shutdown.

-c Cancel an already running shutdown.

time When to shut down. (Required.) *time* can be specified in any of the following ways:

- Absolute time in the format *hh*:*mm*, in which *hh* is the hour (one or two digits) and *mm* is the minute of the hour (two digits).
- Number of minutes to wait in the format *+m*, in which *m* is the number of minutes.
- *now* to immediately shut down; this is equivalent to using *+0* to wait zero minutes.

Refer to the *shutdown*(8) Linux manpage for details. Also refer to the Linux mapage for the *poweroff* command.

NOTE On HP rx7620 servers and rx8620 servers you can configure the nPartition behavior when an OS is shutdown and halted (*shutdown -h* or *poweroff*). The two options are to have hardware power off when the OS is halted, or to have the nPartition be made inactive (all cells are in a boot-is-blocked state).

The normal behavior for Red Hat Linux or SuSE Linux Enterprise Server shutdown and halt is for the nPartition be made inactive.

For details see “ACPI “Softpowerdown” Configuration—rx7620 and rx8620 OS Shutdown Behavior” on page 174.

Linux Shutdown

From the command line for Red Hat Linux or SuSE Linux Enterprise Server, issue the ***shutdown*** command to shut down the operating system.

Step 1. Login to Linux running on the system you want to shut down.

Step 2. Issue the ***shutdown*** command with the desired command-line options, and include the required *time* argument to specify when the operating shutdown is to occur.

For example, *shutdown -r +20* will shutdown and reboot the system starting in twenty minutes.

B Powering On and Off the System

This appendix provides procedures to shut down and bring up a system. Not all steps of some of the procedures apply. For example, if checking the configuration as outlined in “Checking System Configuration” on page 200 and already connected to the host, Step 1. would not be performed.

Chose the appropriate section for the desired task. This appendix provides steps for this purpose.

Shutting Down the System

Use this procedure whenever the system must be shut down. Some of the steps may not apply. For example, the user may already be connected to the host, and therefore, Step 1. of the following procedure would may be ignored.

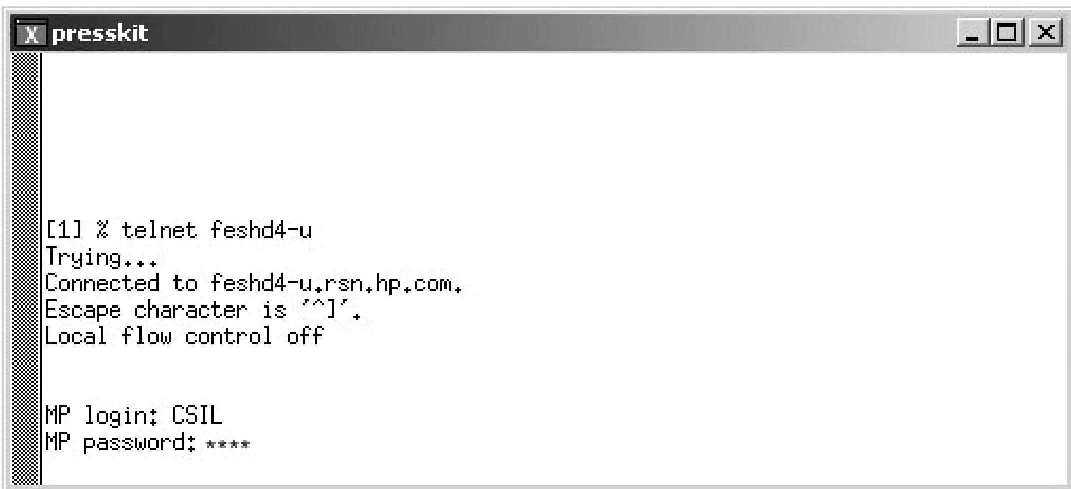
Checking System Configuration

To power down the system, perform the following procedure:

Step 1. Open a command prompt window and connect to the MP by entering:

`telnet` ***<hostname>***

Figure B-1 Connecting to Host



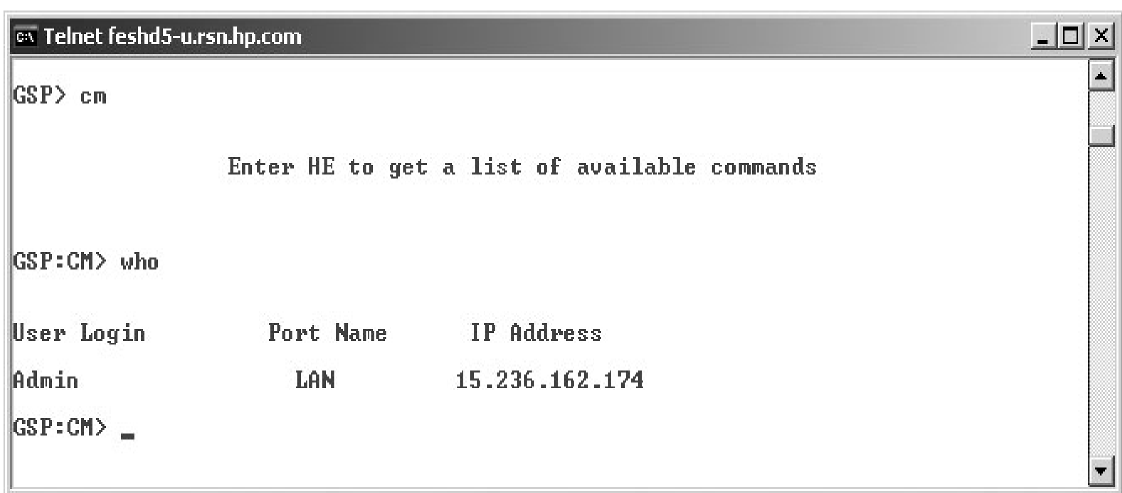
Step 2. Enter the appropriate login and password at the *MP* prompt. The Main Menu appears as shown below:

Figure B-2 Main MP Menu

Step 3. Bring up the Command Menu by entering ***cm*** at the *MP* prompt.

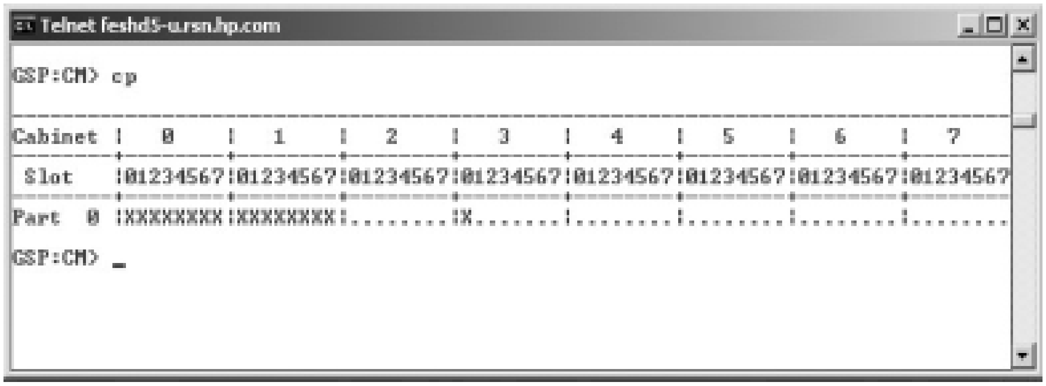
Step 4. Make sure that no one else is using the system by entering ***who*** at the *CM* prompt. Only one user should be seen, as indicated in Figure B-3.

Figure B-3 Checking for Other Users



Step 5. Read the and save the current system configuration by entering ***cp*** and the *CM* prompt. Cabinet and partition information should be displayed as in Figure B-4.

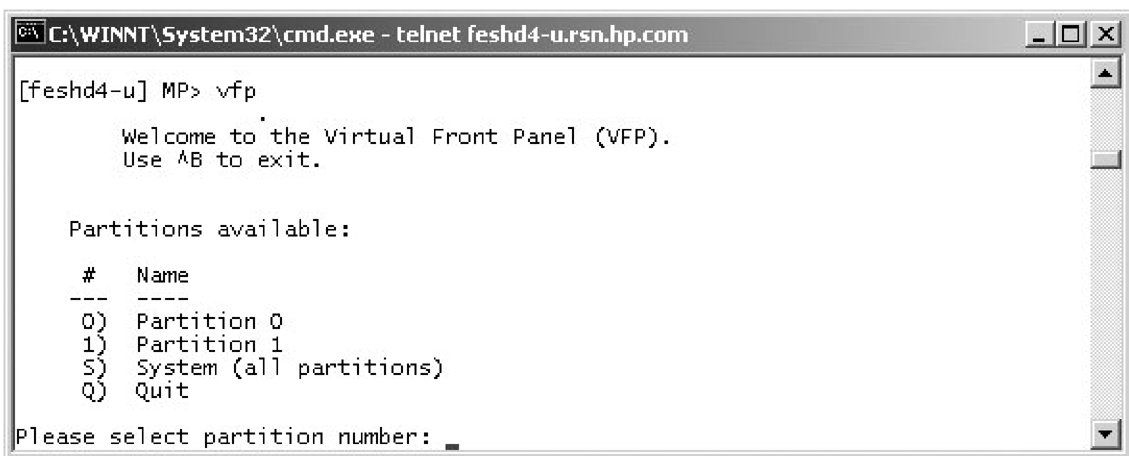
Figure B-4 Checking Current System Configuration



Step 6. Go back to the Main Menu by entering ***ma*** at the *CM* prompt.

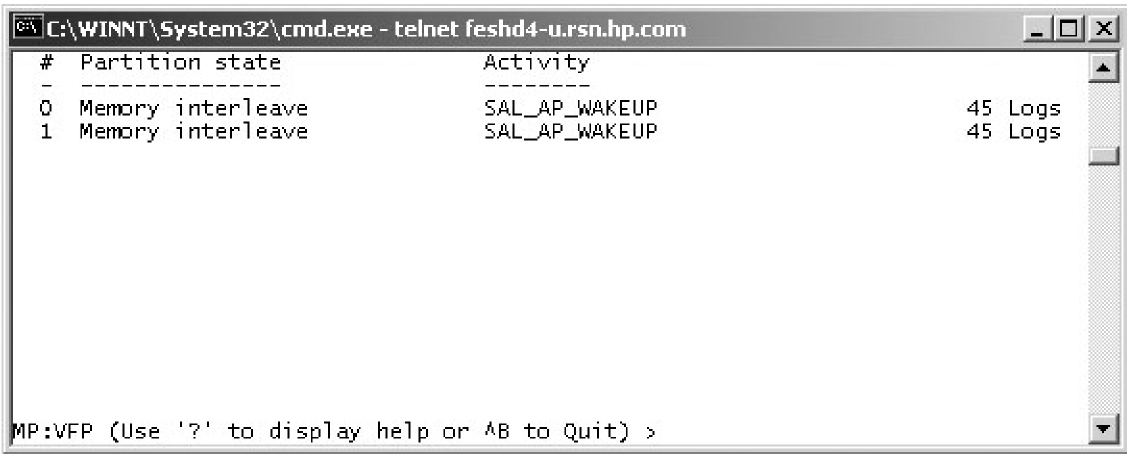
Step 7. From the Main Menu, enter ***vfp*** to bring up the Virtual Front Panel as shown in Figure B-5.

Figure B-5 MP Virtual Front Panel



Step 8. From the VFP, enter ***s*** to select the whole system or the partition number to select a particular partition. An output similar to that shown in Figure B-6 should be observed.

Figure B-6 Example of Partition State

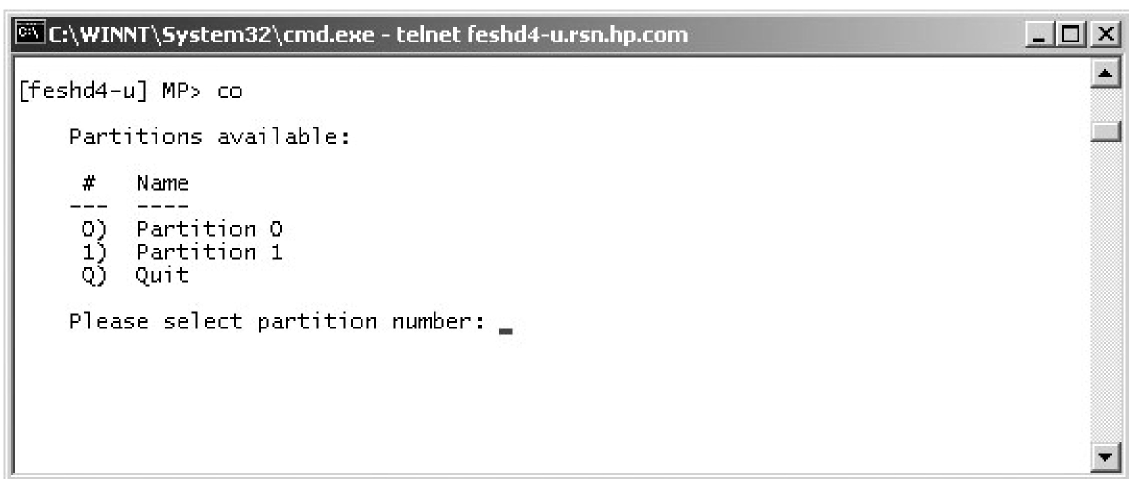


Step 9. Enter **ctrl-B** to exit the Virtual Front Panel and bring up the Main Menu.

Shutting Down the Operating System

The operating system on each partition must be shut down. From the Main Menu prompt, enter ***co*** to bring up the Partition Consoles Menu. The menu is shown in Figure B-7.

Figure B-7 Partition Consoles Menu



For each partition, perform the following steps:

Step 1. Enter the partition number at the prompt.

Step 2. Log onto the console:

- HP-UX: Login as root
- Linux: Login as root

- Windows: Login as Administrator. From the Special Administration Console (SAC> prompt) enter ***cmd*** to start a new command prompt, then type Escape-Tab to switch to the “channel” for the command prompt and login.

Step 3. At the console prompt, shutdown and halt the operating system by entering the shutdown command.

- HP-UX: Enter the ***shutdown -h*** command
- Enter the ***shutdown -h*** *<time>* command, where <time> is the number of minutes until system shutdown
- Windows: Enter the ***shutdown /s*** command

Step 4. Exit the partition console by entering **ctrl-B** after shutting down the system.

Step 5. Repeat Step 1. through Step 4. for each partition.

Preparing the Partitions for Shutdown

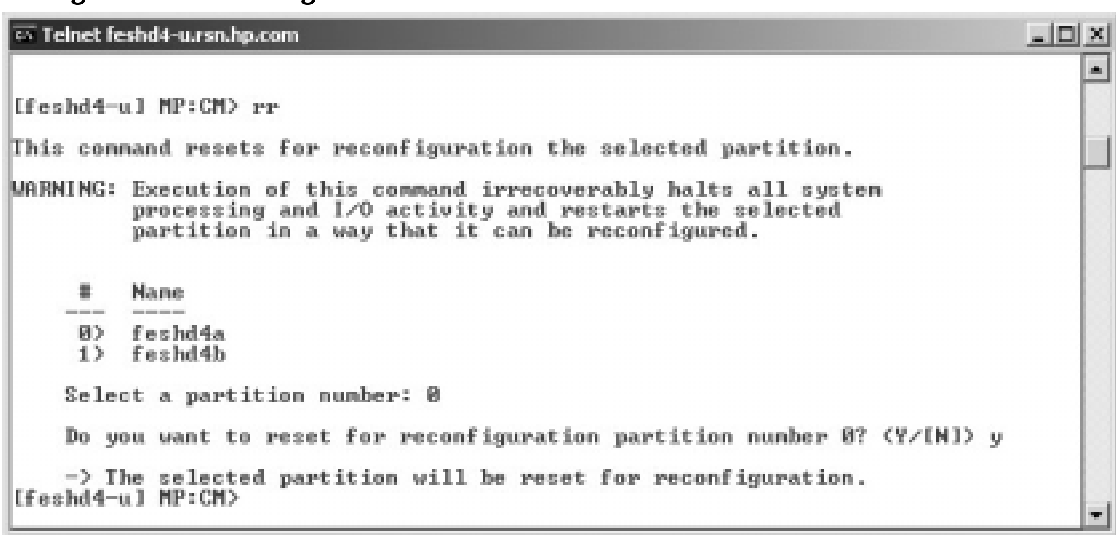
IMPORTANT Before powering off the cabinet(s), it is recommended first that all partitions be brought to *Boot Is Blocked* (BIB).

Perform the following procedure to ensure that all partitions are ready to be shutdown.

Step 1. From the CM prompt, issue an *rr* command as shown in Figure B-8.

Step 2. Enter the partition number and when prompted for reset of the partition number, enter ***Y*** (yes).

Figure B-8 Issuing an rr Command



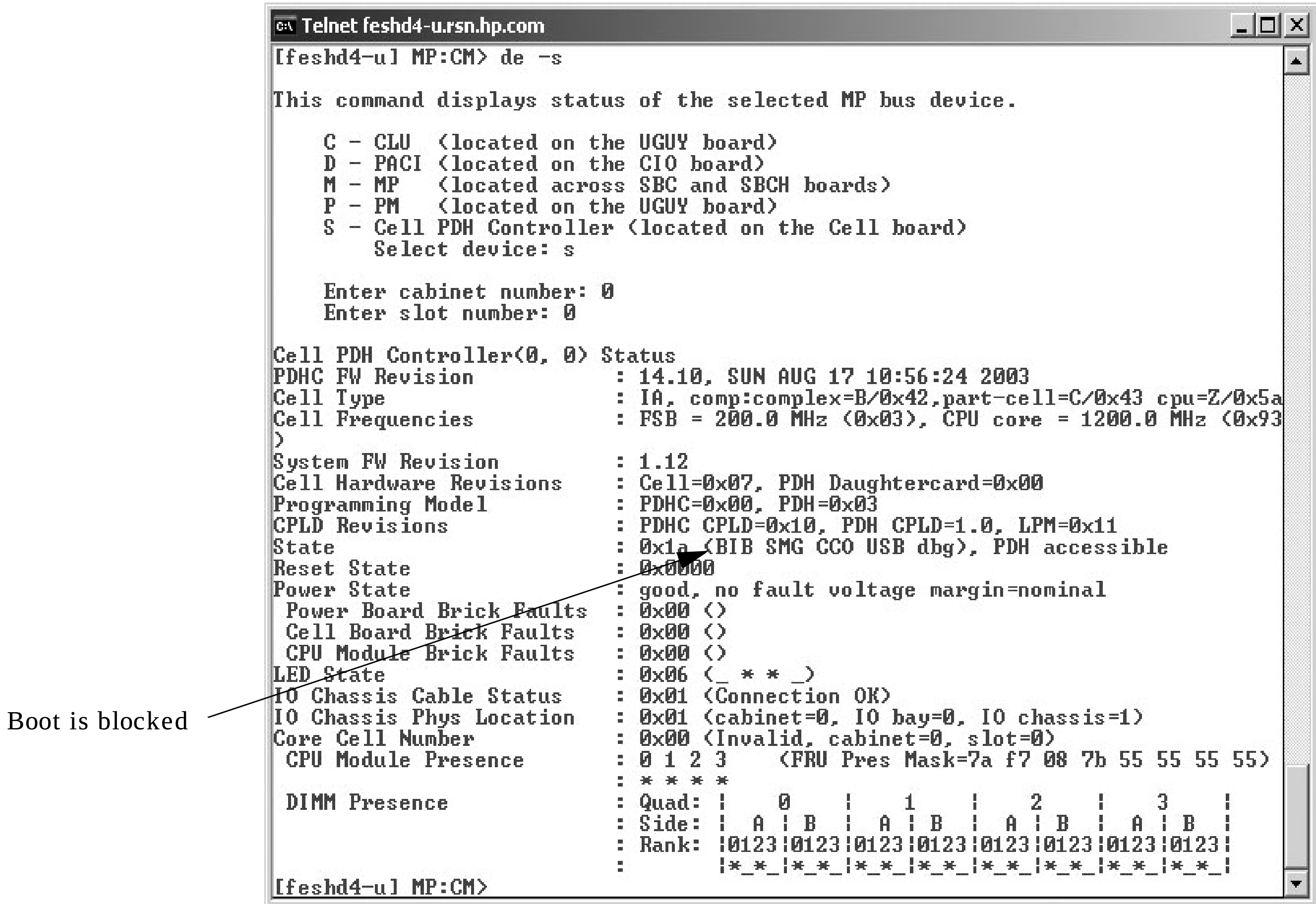
Step 3. At the CM prompt, enter a *de -s* command. See Figure B-9.

Step 4. From the de menu prompt, enter *s* to Cell PDH Controller.

Step 5. When prompted, enter the cabinet and cell board number on which the partition resides.

Step 6. Read the Cell PDH Controller status to determine if the partition is at BIB.

Figure B-9 Using the *de -s* Command



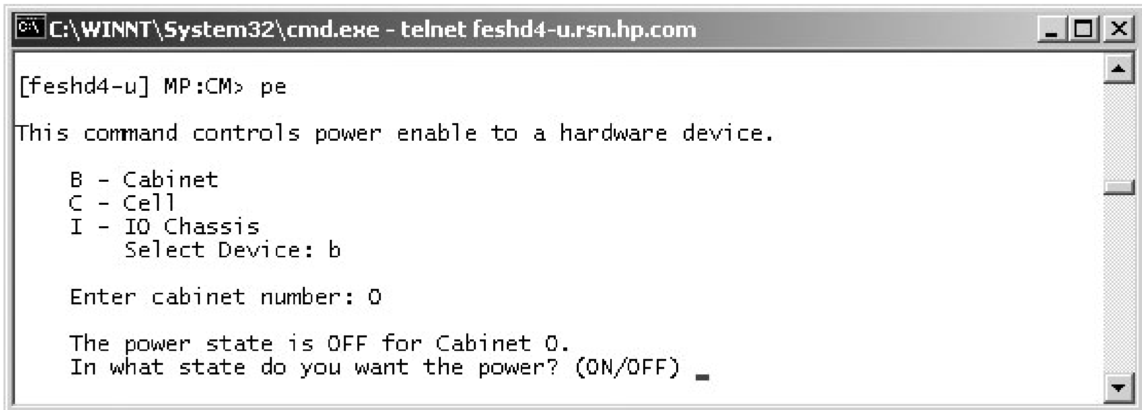
Step 7. Repeat these steps for each partition.

Powering Off the System Using the *pe* Command

Perform the following steps to power off a cell board for removal.

Step 1. From the Command Menu, enter ***pe***.

Figure B-10 Power Entity Command



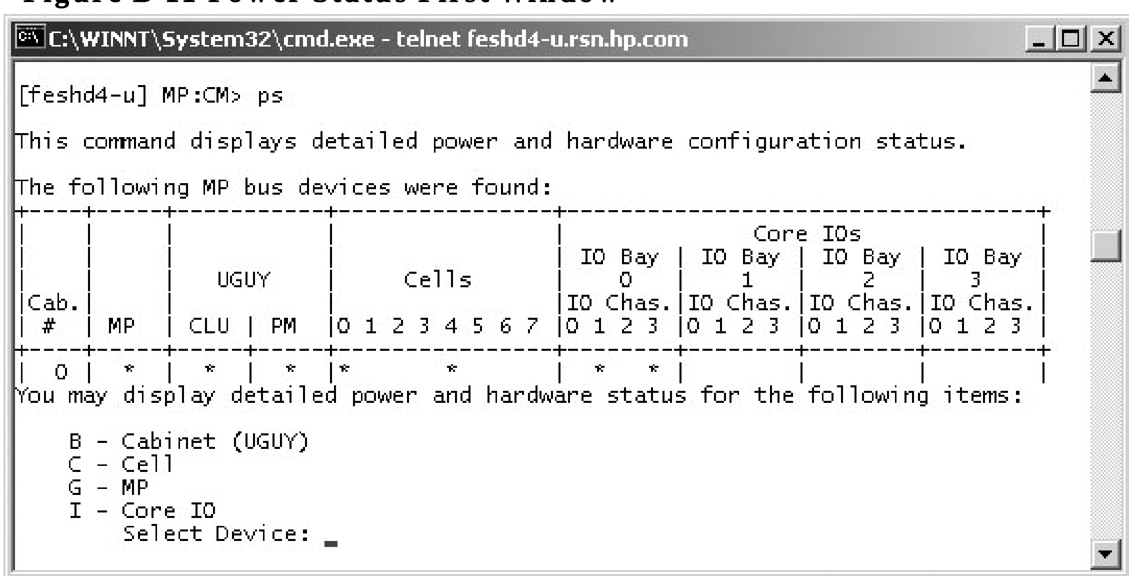
```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

[feshd4-u] MP:CM> pe

This command controls power enable to a hardware device.

    B - Cabinet
    C - Cell
    I - IO Chassis
        Select Device: b

    Enter cabinet number: 0

    The power state is OFF for Cabinet 0.
    In what state do you want the power? (ON/OFF) _
```

Step 2. Enter the number of the cabinet to power off. In this example of Figure B-10, the number is 0.

Step 3. When prompted for the state of the cabinet power, enter ***off***.

Step 4. Now enter ***ps*** (Power Status Command) at the *CM* prompt to view the power status.

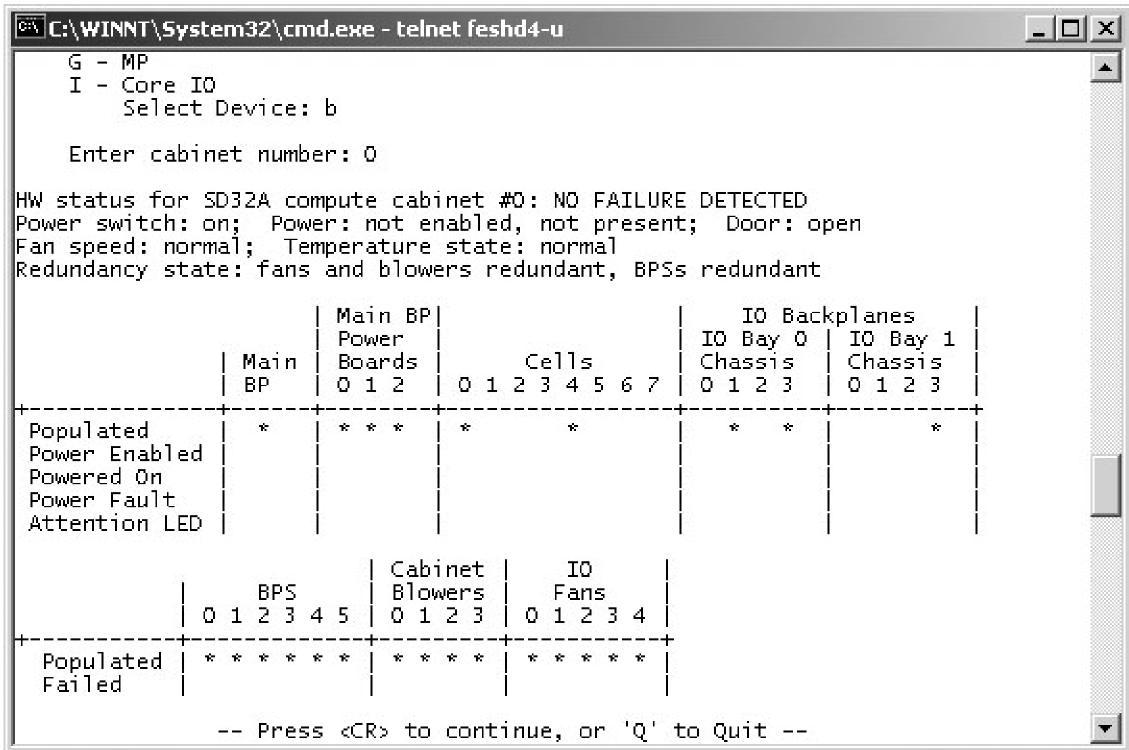
Figure B-11 Power Status First Window



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

[feshd4-u] MP:CM> ps

This command displays detailed power and hardware configuration status.

The following MP bus devices were found:
+----+-----+-----------+----------------+-----------------------------------+
|    |     |           |                |              Core IOs             |
|    |     |           |                | IO Bay | IO Bay | IO Bay | IO Bay |
|    |     |   UGUY    |      Cells     |   0    |   1    |   2    |   3    |
|Cab.|     |           |                |IO Chas.|IO Chas.|IO Chas.|IO Chas.|
| #  | MP  | CLU | PM  |0 1 2 3 4 5 6 7 |0 1 2 3 |0 1 2 3 |0 1 2 3 |0 1 2 3 |
+----+-----+-----------+----------------+--------+--------+--------+--------+
| 0  |  *  |  *  |  *  |*     *         | *   *  |        |        |        |
You may display detailed power and hardware status for the following items:

    B - Cabinet (UGUY)
    C - Cell
    G - MP
    I - Core IO
        Select Device: _
```

Step 5. Enter ***b*** at the select device prompt to select ensure the cabinet power is off. The output should be similar to that in Figure B-12. The Power Switch should be "*on*," but the Power should be "*not enabled*."

Figure B-12 Power Status Second Window



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u
    G - MP
    I - Core IO
        Select Device: b

    Enter cabinet number: 0

HW status for SD32A compute cabinet #0: NO FAILURE DETECTED
Power switch: on;  Power: not enabled, not present;  Door: open
Fan speed: normal;  Temperature state: normal
Redundancy state: fans and blowers redundant, BPSs redundant

                      | Main BP|                  |  IO Backplanes    |
                      | Power  |                  | IO Bay 0 | IO Bay 1 |
               | Main | Boards |      Cells       | Chassis  | Chassis  |
               | BP   | 0 1 2  | 0 1 2 3 4 5 6 7  | 0 1 2 3  | 0 1 2 3  |
+--------------+------+--------+------------------+----------+----------+
 Populated     |  *   | * * *  | *       *        |  *   *   |       *  |
 Power Enabled |      |        |                  |          |          |
 Powered On    |      |        |                  |          |          |
 Power Fault   |      |        |                  |          |          |
 Attention LED |      |        |                  |          |          |

                          | Cabinet |    IO     |
            |    BPS      | Blowers |   Fans    |
            | 0 1 2 3 4 5 | 0 1 2 3 | 0 1 2 3 4 |
+-----------+-------------+---------+-----------+
  Populated | * * * * * * | * * * * | * * * * * |
  Failed    |             |         |           |

               -- Press <CR> to continue, or 'Q' to Quit --
```

The cabinet is now powered off.

Turning On Housekeeping Power

Step 1. Verify that the AC voltage at the input source is within specifications for each cabinet being installed.

Step 2. Ensure that:

- The AC breakers are in the Off position. See Figure B-13.
- The cabinet power switch at the front of the cabinet is in the Off position.
- The AC breakers and cabinet switches on the I/O Expansion Cabinet (if one is present) are in the Off position.

Step 3. If the complex has an IOX cabinet, power on this cabinet first.

Step 4. Turn on the AC breakers on the PDCA(s) at the back of the each cabinet.

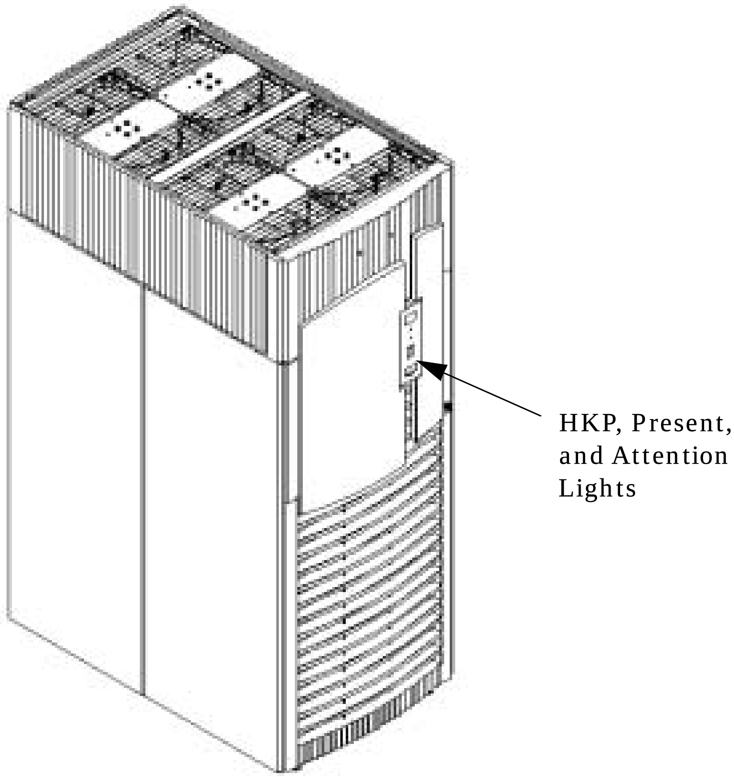
In a large complex cabinets should be powered on in one of the two following orders: 9, 8, 1, 0 or 8, 9, 0, 1.

On the front and back panel, the HKP and the Present lights should illuminate.

On cabinet 0, the HKP and the Present lights illuminate, but only the HKP LED illuminates on cabinet 1 (the right cabinet).

NOTE The 48-volt switch on the front panel should be off at this time.

Figure B-13 Front Panel Display with Housekeeping (HKP) Power On, and Present Indicators

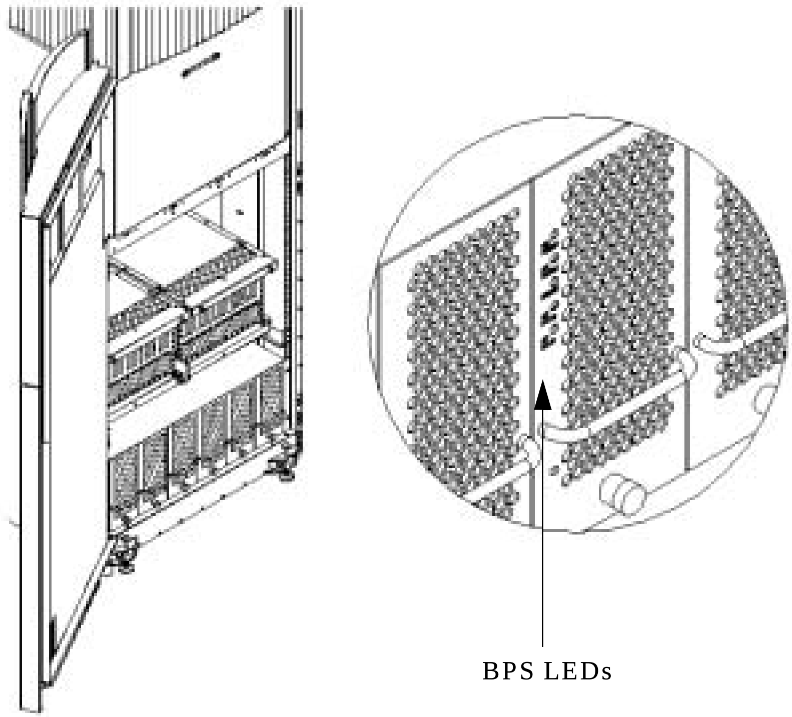


Step 5. Check the BPS LEDs.

When on, the breakers on the PDCA distribute power to the BPSs. AC power is present at the BPSs when:

- The amber light on the BPS next to the label AC0 Present (if the breakers on the PDCA on the left side at the back of the cabinet) is on.
- The amber light on the BPS next to the label AC1 Present (if the breakers on the PDCA on the right side at the back of the cabinet) is on.

Figure B-14 BPS LEDs



Powering on the System Using the *pe* Command

This section describes how to power up the system.Use the following procedures anytime the system needs to be powered on.

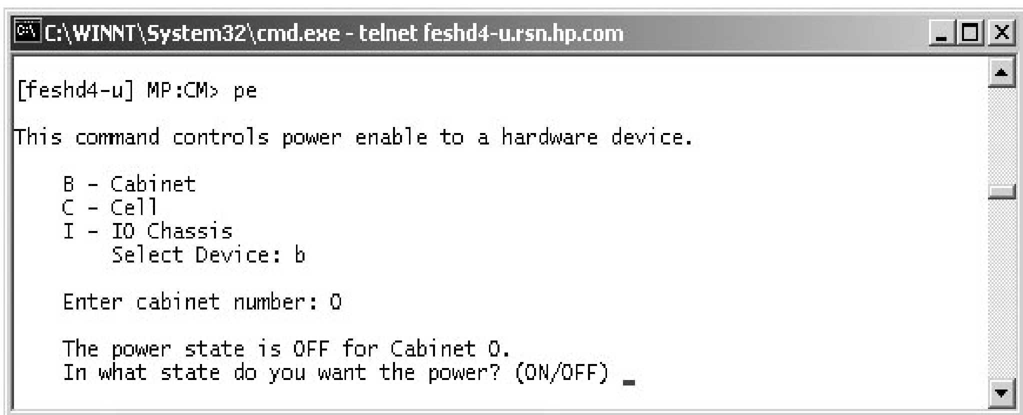
Step 1. From the Command Menu, enter the ***pe*** command.

IMPORTANT If the complex has an IOX cabinet, power on this cabinet first.

In a large complex cabinets should be powered on in one of the two following orders: 9, 8, 1, 0 or 8, 9, 0, 1.

Step 2. Enter ***B*** and then the cabinet number as shown in Figure 0-1.

Figure 0-1 Power Entity Command



Step 3. The power state is OFF. Enter ***on*** to power up the cabinet.

Step 4. From the *CM* prompt, enter ***ps*** to observe the power status. The status screen shown in Figure 0-2 appears.

Figure 0-2 Power Status First Window

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

[feshd4-u] MP:CM> ps

This command displays detailed power and hardware configuration status.

The following MP bus devices were found:
+----+-----+-----------+----------------+-----------------------------------+
|    |     |           |                |              Core IOs             |
|    |     |           |                | IO Bay | IO Bay | IO Bay | IO Bay |
|    |     |   UGUY    |      Cells     |   0    |   1    |   2    |   3    |
|Cab.|     |           |                |IO Chas.|IO Chas.|IO Chas.|IO Chas.|
| #  | MP  | CLU | PM  |0 1 2 3 4 5 6 7 |0 1 2 3 |0 1 2 3 |0 1 2 3 |0 1 2 3 |
+----+-----+-----------+----------------+--------+--------+--------+--------+
| 0  |  *  |  *  |  *  |*       *       | *   *  |        |        |        |
You may display detailed power and hardware status for the following items:

    B - Cabinet (UGUY)
    C - Cell
    G - MP
    I - Core IO
        Select Device: _
```

Step 5. At the “Select Device” prompt, enter B then the cabinet number to check the power status of the cabinet. Observe that the Power Switch: on and Power: enabled as shown in Figure 0-3.

Figure 0-3 Power Status Window

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
    G - MP
    I - Core IO
        Select Device: b

    Enter cabinet number: 0

HW status for SD32A compute cabinet #0: NO FAILURE DETECTED
Power switch: on;  Power: enabled, good;  Door: open
Fan speed: high;  Temperature state: normal
Redundancy state: fans and blowers redundant, BPSs redundant

                      | Main BP|                 |     IO Backplanes    |
                      | Power  |                 | IO Bay 0 | IO Bay 1  |
               | Main | Boards |      Cells      | Chassis  | Chassis   |
               | BP   | 0 1 2  | 0 1 2 3 4 5 6 7 | 0 1 2 3  | 0 1 2 3   |
+--------------+------+--------+-----------------+----------+-----------+
 Populated     |  *   | * * *  | *       *       |   *   *  |           |
 Power Enabled |  *   | * * *  | *       *       |   *   *  |           |
 Powered On    |  *   | * * *  | *       *       |   *   *  |           |
 Power Fault   |      |        |                 |          |           |
 Attention LED |      |        |                 |          |           |

                          | Cabinet |    IO     |
             |    BPS     | Blowers |   Fans    |
             | 0 1 2 3 4 5| 0 1 2 3 | 0 1 2 3 4 |
+------------+------------+---------+-----------+
  Populated  | * * * * * *| * * * * | * * * * * |
  Failed     |            |         |           |

          -- Press <CR> to continue, or 'Q' to Quit --
```

C EFI Boot Maintenance Manager for hp Integrity Superdome

One of the options in the EFI menu is the Boot Maintenance Menu. This appendix describes how to change how the system boots. If the system boot does not need to be changed, ignore this section.

From the EFI shell select the Boot Maintenance Manager. Looking at Figure C-1, the options are described below:

Figure C-1 Boot Maintenance Manager Menu

Use the up arrow or down arrow to highlight the option, then press enter.

- Select Active Standard Error Devices—Selects from a list the standard error device.
- Cold Reset— Resets the system
- Exit

Boot From a File

The “Boot from a file” option specifies EFI applications and boots the system. Figure C-2 shows an example of the available volumes from which to boot. To select a volume, use the up arrow or down arrow to highlight the option, then press enter.

Figure C-2 EFI Boot Selections

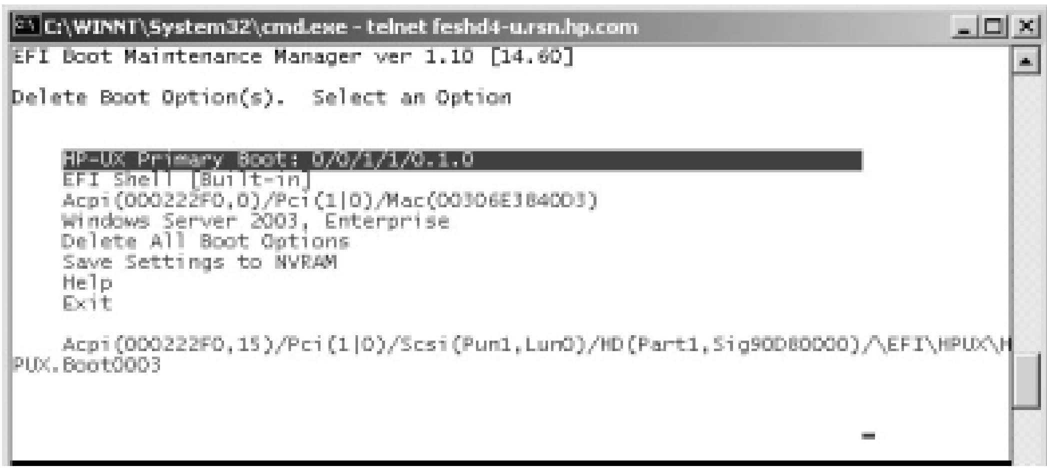
Add a Boot Option

The “Add a Boot Option” option provides a way to add EFI applications. Selecting this options brings up a menu like the one show in Figure C-2. To select a volume, use the up arrow or down arrow to highlight the option, then press enter. If the change is to be stored, select the “Save Settings to NVRAM” options and press enter.

Delete a Boot Option

The “Delete Boot Option(s)” provides a means to delete boot options from the EFI Boot Manager. Figure C-3 shows an example of “current” boot options that may be deleted. To select a boot option from the list, use the up arrow or down arrow to highlight the option, then press enter. If the change is to be stored, select the “Save Settings to NVRAM” options and press enter.

Figure C-3 Example of Boot Options



Change Boot Order

The “Change Boot Order” options provides a means to change the list of boot options in the EFI Boot Manager. To move an item in the order of the list (like the example shown in Figure C-3), highlight it using the up or down arrow keys. To move it up in the order press ***U*** or ***u***. To move it down, press ***D*** or ***d***. If the change is to be stored, select the “Save Settings to NVRAM” options and press enter.

Manage BootNext Setting

The “Manage BootNext setting” selects the most favored boot option for the next boot operation (next time only). Figure C-4 shows an example list of boot options. To select a boot option, highlight the option using the arrow keys. Press enter, or ***B*** or ***b*** to make this option as BootNext. To remove a BootNext setting, select the “Reset BootNext Setting” menu item or press ***R*** or ***r***. If the change is to be stored, select the “Save Settings to NVRAM” options and press enter.

Figure C-4 Setting BootNext

Set Auto Boot Timeout

The “Set Auto Boot Timeout” option specifies a timeout value until the next auto boot. Figure C-5 shows an example of the selections available for this option. To change the timeout value, highlight the “Set Timeout Value” selection using the arrow keys and press enter.

Figure C-5 Auto Boot Timeout

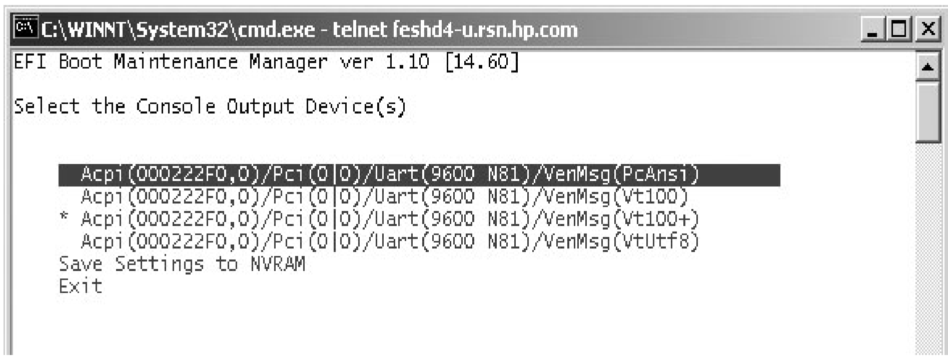
The value, in seconds, may be any integer up to 65535. If the value 0 is specified, there is no wait to boot. To disable the use of the timeout variable, the following three choices are available:

1. Using the “Delete/Disable Timeout” menu option for delete the timeout variable
2. Setting the timeout value to 65535
3. Pressing a key when EFI is booting disables the timeout count down.

Select Active Console Output/Input Devices

The “Select Active Console Output Devices” and “Select Active Console Input Devices” options both have the same functionality. They provide a means to select from a list the active console devices. An example is shown in Figure C-6. To select a device from the list, use the up arrow or down arrow to highlight the option, then press enter. If the change is to be stored, select the “Save Settings to NVRAM” options and press enter.

Figure C-6 Select Active Devices



Select Active Standard Error Devices

The “Select Active Standard Error Devices” option selects from a list the standard error device. It provides a means to select from a list the error devices The selections menu is very similar to that shown in Figure C-6. To select a device from the list, use the up arrow or down arrow to highlight the option, then press enter. If the change is to be stored, select the “Save Settings to NVRAM” options and press enter.

Cold Reset

Selecting “Cold Reset” performs a hard reset of the system.

D Configuration

Adding additional capacity to an existing system requires careful consideration and planning. A Solution Implementation Plan (SIP) should be developed before visiting the customer site.

A Solution Manager assigned by HP's Global Sales Services (GSS) working with the account owner, will identify the system configurations, services, and training required to meet the customer's needs.

The physical configuration and site preparation will be handled by Global Deployment Services (GDS), managed by their Deployment Manager, working with ESSO to complete the physical installation.

Configuration Guidelines

To achieve the best performance and high availability consider the following factors as shown in order of importance:

1. Memory Population
2. Cell Population
3. Partition Size
4. I/O Chassis Allocation

Memory Population

Each cell has four memory busses that must be evenly populated to achieve full bandwidth and reduce latency. Configurations of 4 Gbytes, 8 Gbytes, 12 Gbytes, 16 Gbytes, and 32 GBytes per cell accomplish this.

Memory must be symmetric within each partition for interleaving to be even across all the cells, otherwise performance problems can result. Consider the following example:

Example D-1 Incorrect Memory Distribution Across Partitions

If a two cell partition has 2 Gbytes of memory on one cell and 16 Gbytes on another, 4 Gbytes will be interleaved (two from each cell) and 14 Gbytes will be assigned to one cell only. This will result in inconsistent bandwidth and latency problems.

Cell Population

A group of four cells (a *quad*) resides on one Crossbar Chip (XBC) and has the lowest latency. *Quads* are slots 0-3, 4-7, 8-11 and 12-15.

Keep partitions with a size less than or equal to four on the same *quad*.

Memory traffic from one *quad* to another is routed in pairs. The following pairs share the same path: 0 and 1, 2 and 3, 4 and 5, and 6 and 7.

The hp Integrity Superdome or hp 9000 Superdome SD32 can have dual links between *quads* if U-turns are installed on the backplane. To use both links a six-cell partition uses slots 0-3, 5, and 7 as would 4 and 6.

Partitions that share links share common points of failure.

XBC-XBC links can saturate and kill performance. An eight-cell partition on an SD6400 should be spread across cabinets. Cab 0, slots 0-3, 5, 7 and Cab 1, slots 4 and 6.

Partition Size

For best performance, partitions should be either single cell or greater powers of 2: 2, 4, 8, and 16 cells.

Memory interleaving is performed by taking either four or six physical address bits and using them to index into a cell mapping table entry consisting of 16 or 64 sub-entries. For a single cell partition, each sub-entry is loaded with only one cell. A two-cell partition alternates between the two cells. There is one 64 sub-entry cell map entry and a 48-16 sub-entry cell entry.

Partitions that are not powers of two will undergo *revisiting*. Consecutive accesses will go through all the cell boards and come back through revisiting as many cells as necessary until all memory is utilized and the 64-entry table is filled.

Table D-1, hp Integrity Superdome or hp 9000 Superdome SD64 Partition Configurations, shows configurations that yield the best performance. However, memory may be left over. This memory is interleaved in the 16-entry tables and does not always yield the best performance. Depending on the memory configuration and the partition size the memory system performance will always increase, although not always linearly.

Use the following guidelines when building partitions:

- Build the largest partition first.
- Keep partitions with four cells or less on the same quad. (Slots 0-3, 4-7, 8-11, and 12-15)
- Keep the amount of memory on each cell in a partition as equal as possible.
- Fill empty cabinets before adding to a partially populated cabinet.
- For best performance, partitions should be either single cell or greater powers of 2: 2, 4, 8, and 16 cells.
- Always check a new partition for bottlenecks with the formula Qx*Qy/Qt/I. See XBC-XBC Link Load Equation for more information.

The partitions in the following tables provide good but not always optimum link loading while allowing for growth.

Table D-1 hp Integrity Superdome or hp 9000 Superdome SD64 Partition Configurations

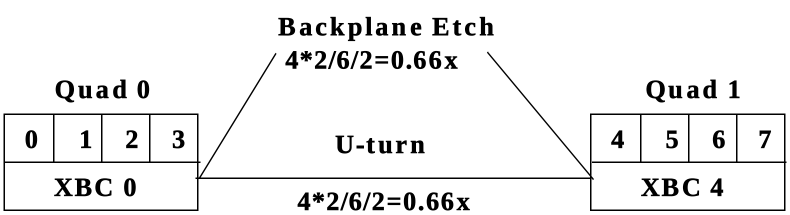
Number of Cells per partition	**Cabinet 0 - Cell Slots (Cells 0-7)**								**Cabinet 1 - Cell Slots (Cells 8-15)**								**Number of Partitions**
	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	
1	A	I	E	M	C	K	G	O	B	J	F	N	D	L	H	P	16
2	A	E	A	E	C	G	C	G	B	F	B	F	D	H	D	H	8
2														I	I		1
2					J										J		1
2				K				K				L				L	2
3	A	A	A		C	C	C		B	B	B		D	D	D		4
3														E	E	E	1
4	A	A	A	A	C	C	C	C	B	B	B	B	D	D	D	D	4
4					E		E							E		E	1
5	A	A	A	A				A	B	B	B	B				B	2
6	A	A	A	A		A		A	B	B	B	B		B		B	2
7	A	A	A	A		A	B	A	B	B	B	B	A	B		B	2
8	A	A	A	A	B	A	B	A	B	B	B	B	A	B	A	B	2
9	A	A	A	A	A	A		A					A		A		1
10	A	A	A	A	A	A	A	A					A		A		1
11	A	A	A	A	A	A	A	A					A	A	A		1
12	A	A	A	A	A	A	A	A					A	A	A	A	1
13	A	A	A	A	A	A	A	A				A	A	A	A	A	1
14	A	A	A	A	A	A	A	A		A		A	A	A	A	A	1
15	A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	1
16	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	1
																	54

Table A-2 HP Integrity Superdome SD32 Partition Configurations

Table D-2 hp Integrity Superdome or hp 9000 Superdome SD32 Partition Configuration

Number of Cells per partition	Cabinet 0 - Cell Slots (Cells 0-7)								Number of Partitions
	0	1	2	3	4	5	6	7	
1	A	E	C	G	B	F	D	H	8
2	A	C	A	C	B	D	B	D	4
2				E				E	1
3	A	A	A		B	B	B		2
4	A	A	A	A	C	C	C	C	2
5	A	A	A	A				A	1
6	A	A	A	A		A		A	1
7	A	A	A	A		A	A	A	1
8	A	A	A	A	A	A	A	A	1
									21

Figure D-1 hp Integrity Superdome or hp 9000 Superdome SD32



XBC-XBC Link Load Equation

A simple calculation can be made to evaluate whether or not a particular configuration will have bottlenecks.

1. The number of cells on one quad, Qx, that talk to another quad Qy
2. The total number of cells is Qt
3. The number of links between the two quads is L. (Always 1)
4. Link load is Qx*Qy/Qt/L. (Link load = 4*4/8/2 = 1).

   Strive always for a link load of 1.0 or less.

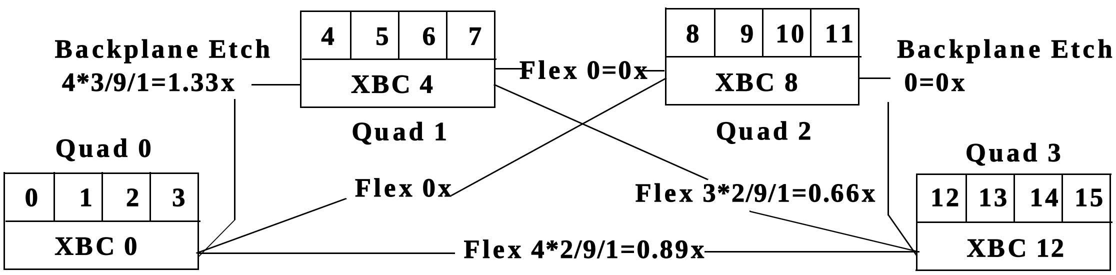
The lower the link load, the better off the system. If link loads begin to approach 2, bottlenecks may occur.

For a dual cabinet system, there are six equations covering each link:

1. Quad 0 talking to Quad 1 L1 = Q0*Q1/Qt/1
2. Quad 0 talking to Quad 2 L2 = Q0*Q2/Qt/1
3. Quad 0 talking to Quad 3 L3 = Q0*Q3/Qt/1
4. Quad 1 talking to Quad 2 L4 = Q1*Q2/Qt/1
5. Quad 1 talking to Quad 3 L5 = Q1*Q3/Qt/1
6. Quad 2 talking to Quad 3 L6 = Q2*Q3/Qt/1

Figure D-2 shows a nine-cell partition on an SD64 spread across cabinets: Cab 0, slots 0-5, 7 and Cab 1, slots 12 and 14.

Figure D-2 9 Cell Partition



I/O Chassis Allocation

For best high availability, I/O devices are connected to different I/O Bays to reduce single points of failure.

Rules dictate that the roots are selected first, then all other I/O are added.

I/O can connect anywhere, but tools will guide you to the best selection.

System Planner

The System Planner is a tool available under AIM. Click on File>Enable>SuperDome>Calculator and Planner.

Using the System Planner you can create a system with partitions ordered with the following information:

- Number of cell boards, memory modules, and active CPUs
- Number of cell boards to reserve for future expansion

E Replaceable Parts

Table E-1 Superdome HP9000 and HP Integrity Superdome with PA-RISC & IPF Processors

FRU DESCRIPTION	Replacement FRU Part No.	Exchange FRU Part No.
PCA BOARDS		
ASSY, HLSB3 (Left System Backplane), incl. HLSB, 4 XBC (TOGO'), 6 ASICS Covers, NO P/S ,		A5201-69401
ASSY, HRSB2 (Right System Backplane)incll. HLSB, 4 XBC (TOGO') 6 ASICS Covers, NO P/S ,		A5201-69302
ASSY, DLB2(Dome Lite Backplane) incl DLB, 2 XBC (TOGO), ? ASIC Covers, NO P/S, NO RC (SAKURAS)		A6113-69102
BD ASSY, HBPB2 (Backplane Power Board)		A5201-69003
MODULE. CCB3, 750Mhz P8700 Processors, (Cell Board w/4-PCW, HCPB, DNA, I NO memory)		A6445-69003
MODULE, PACU, 875Mhz P8700+ Processors, (Cell Board w/4-PCW, HCPB,DNA, / NO Memory)		A6862-69001
CELL PROCESSOR BOARD. ORCA/MADISON, IPF 1.5Ghz, 6MB cache, (incl 4 proc./ & daughter card/ incls NO memory)		AB283-69001
CELL PROCESSOR BOARD, ORCA/MAKO, DUAL PARISC PA-8800, 1.0Ghz, 32MB cache, (incl 4 proc./ NO memory or Power Board)		AB284-69001
CELL PROCESSOR BOARD, HONDO, DUAL IPF 1.1Ghz(incl 4 dual proc/ NO memory) or Power Board)		AB285-69001
CELL PROCESSOR BOARD, Orca/Mad9m, IPF, 1.6GHZ 9MB cache, (incl 4 proc /NO memory) or Power Board)		AD011-69001
CELL POWER BOARD, OCPB3, ORCA IPF and PA8800		A6866-69001
BD ASSY, CIO5, PCIX Chassis, (Core IO)		A6865-69001
MODULE, HIOB, PCI Card Cage Assy 3.3/5.0volts (12 Slot IO Chassis w/ HIOB, HIOPB, HIOBP, REO ASIC)		A4856-69101
MODULE,GXIOB, PCIX Card Cage Assy (12 slot I/O Chassis w/GIXOB, , GPCIXP, GPCIXPB2, REO ASIC)		A6864-69101
BD ASSY, UGUY5-500 (500Mhz Utilities Board)		A6475-69001
MODULE ASSY, incl SBC & SBCH4		A5201-69113
MODULE ASSY, incl SBC2 & SBCH		A5201-69129
BD ASSY, DIMM, 512MB, single DIMM		A5198-69101
BD ASSY, DIMM, 1Gb, single DIMM		A6098-69101

Table E-1 Superdome HP9000 and HP Integrity Superdome with PA-RISC & IPF Processors (Continued)

FRU DESCRIPTION	Replacement FRU Part No.	Exchange FRU Part No.
BD ASSY, DIMM, 2Gb, single DIMM		A6100-69001
BD ASSY, HMIOB (Master IO Backplane)	A5201-67001	
BD ASSY, HFPB3 (Front & Rear LED Panel Board)	A5201-67002	
ASSY, UTILITY CHASSIS, includes HUCB (utility connector board)	A5201-67003	
BD ASSY, HCOLB, (Cabinet On-Line Board with temp sensor	A5201-67065	
BD ASSY, SMS Modem Card, 56K V.92/V.44 DATA FAX	0960-2197	
CELL, VRM 9.0, LINK, CCORE, & FSB VR 1.2/1.8volts, (voltage regulator module), Integrity ONLY	0950-4462	
CELL, VRM 8.5, L2C & CLK VR, 2.5/3.3volts, (voltage regulator module), Integrity ONLY	0950-4515	
CELL TERMINATOR, req for single processor module Cell, used on MAKO & HONDO only	A6866-60005	
BD ASSY, SBC (Single Board COMPUTER)		A5201-69005
CABLES		
ASSY, HBFC1 (Backplane to Backplane Flex Cable), 5" includes attaching hardware	A5201-04027	
ASSY, HBFC2 (Backplane to Backplane Flex Cable), 8" includes attaching hardware	A5201-04028	
ASSY, HBFC3 (Backplane to Backplane Flex Cable), 2" includes attaching hardware	A5201-04039	
CABLE ASSY, Ethernet SBCH-SBC (single board computer hub to single board computer)	A5201-63006	
CABLE ASSY, 48VDC to HLSB, sense	A5201-63007	
CABLE ASSY, I/O OL* LED ASSY (on-line addition/deletion)	A5201-63013	
CABLE ASSY, I/O FAN Control /Power harness	A5201-63014	
CABLE ASSY, I/O to Utilities cable	A5201-63015	
CABLE ASSY, Main Blower control / Power harness	A5201-63016	
CABLE ASSY, 500 MHz Clock Cables (Utilities Board to Master IO Backplane)	A5201-63020	
CABLE ASSY, UGUY-HLSB CLOCK, (Utilities Board to Left System Backplane)	A5201-63021	

Table E-1 Superdome HP9000 and HP Integrity Superdome with PA-RISC & IPF Processors (Continued)

FRU DESCRIPTION	Replacement FRU Part No.	Exchange FRU Part No.
CABLE ASSY, HKP power to HLSB (house keeping power to Utilities Connector Board)	A5201-63028	
CABLE ASSY, Ring I/O adapter (REO), 82	"A5201-63066	
CABLE ASSY, Com1 & Com2, SBCH-SBC (single board computer hub to single board computer)	A5201-63039	
CABLE ASSY, Front Panel Display	A5201-63041	
CABLE ASSY, 48VDC sense to HUCB, sense	A5201-63043	
CABLE, HKP-HMIOB, rear	A5201-63044	
CABLE ASSY, FEPS Power Control & Sense Cable (front end power supply)	A5201-63045	
CABLE ASSY, FEPS to power filter (front end power supply)	A5201-63046	
CABLE ASSY, 5V external feed through filter	A5201-63047	
CABLE ASSY, Cell OL* LED and temp sensor cable (on-line addition/deletion)	A5201-63049	
CABLE ASSY, Front EMI cover sense	A5201-63050	
CABLE ASSY, 48VDC power to I/O feed	A5201-63051	
CABLE ASSY, Utilities-1 cable	A5201-63052	
CABLE ASSY, Utilities-2 cable	A5201-63053	
CABLE ASSY, HKP power to HUCB (house keeping power to Utilities Connector Board)	A5201-63054	
CABLE ASSY, USBE, unshielded	A5201-63058	
CABLE ASSY, ON-OFF Switch, to FPB	A5201-63059	
CABLE ASSY, Front & Rear panel Display - Bulkhead connector	A5201-63062	
CABLE ASSY, ground, front door to chassis	A5201-63065	
CABLE ASSY, ground, front control panel to door	A5201-63068	
C7537A Ethernet Cable 25FT CAT 5 M/M	5183-2687	
CABLE ASSY, SMS Modem, Phone cord, 25 ft., Integrity ONLY	8121-0862	
POWER SUPPLIES & AC CABLING		
PWR ASSY, BPS (Bulk Power Supply)		A5201-69118

Table E-1 Superdome HP9000 and HP Integrity Superdome with PA-RISC & IPF Processors (Continued)

FRU DESCRIPTION	Replacement FRU Part No.	Exchange FRU Part No.
PWR ASSY, PDCA, 200-240VAC, 3 phase 4-wire, phase to phase, (Power Dist. Control Assy)		A5201-69009
PWR ASSY, PDCA, 200-240 VAC, 3 phase 5-wire, phase to neutral, (Power Dist. Control Assy)		A5201-69008
PWR ASSY, FEPS (Front End Power System)		A5201-69007
PWR ASSY, PDCA, 200-240VAC, 3 phase 4-wire, phase to phase, incl cord, plug (Power Dist. Control Assy)		A5201-69015
PWR ASSY, PDCA, 200-240 VAC, 3 phase 5-wire, phase to neutral, incl cord, plug (Power Dist. Control Assy)		A5201-69016
PWR ASSY, PDCA, 200-240VAC, 3 phase 4-wire, phase to phase, incl cord, plug (Power Dist. Control Assy)		A5201-69023
PWR ASSY, PDCA, 200-240 VAC, 3 phase 5-wire, phase to neutral, incl cord, plug (Power Dist. Control Assy)		A5201-69024
IN-LINE CONNECTOR, PDCA, 200-240VAC, 3 phase, 60/63Amps, 4-wire	1253-5308	
IN-LINE CONNECTOR, PDCA, 200-240VAC, 3 phase, 30/32Amps, 5-wire	1253-5311	
MISCELLANEOUS		
DVD DDS4, WRITER DRIVE ASSY, SMS, internal		P8680-69001
MONITOR, SMS stand alone, 15" color	2090-0913	
MONITOR, SMS rack mount, 1U, incl keyboard & mouse	350513-001	
FAN Module, Cell area, mounted on top of chassis (1 fan & mounting hrdw)		A5201-69011
I/O Fan Module, incl. Fan, finger guard, mtg brkt, cable, operational, caution & fuse labels	A5201-04035	
Strain Relief, Backplane to REO cable	A5201-00447	
ASSY, FILTER, 48V, w/attaching hardware	A5201-67067	
KIT, Overlay , label, PCI card cage	A5201-67068	
Mfab, Kit, Superdome Cabinet interconnect	A5201-62034	
KIT, COVERS, processor module pins & processor board socket, Madison IPF, Integrity ONLY	5169-0431	
COVER, HBFC, backplane flex cable socket dust cover	1200-4446	

Table E-1 **Superdome HP9000 and HP Integrity Superdome with PA-RISC & IPF Processors (Continued)**

FRU DESCRIPTION	Replacement FRU Part No.	Exchange FRU Part No.
Mfab, Halfdome Base Assy, LCD Module, incl main cabinet 48V Distribution Buss	A5201-62010	
ASSY, Front Control Panel Cosmetic kit , pre Integrity	A5201-04016	
ASSY, Front Control Panel Cosmetic kit, Integrity ONLY	A5201-04055	
ASSY, Rear Control Panel Cosmetic kit	A5201-04017	
KIT,FRONT DOOR LIMITER	A5201-70008	
KIT, FRONT DOOR LATCH	A5201-70009	
ASSY, Buss Bar, 48V Distribution, Cell Power	A5201-00471	
ASSY, Cover, ASIC, Cell Backplane	A5201-00291	
ASSY, I/O Fan Mounting Frame,	A5201-04005	
ASSY, PDCA Mount, enclosure for 2 PDCA's & 10 cable groomers	A5201-04034	
ASSY, I/ Chassis Support Tray, incl tray, L & R rails, RFI strips, & power filter	A5201-04010	
ASSY, Blower housing Front only (incls NO Blowers)	A5201-62030	
ASSY, Blower housing Rear only (incls NO Blowers)	A5201-62029	
Mfab, Cover, Fan Power Mount	A5206-00476	
AIR BLOCKER, Cover, fits into empty cell slot	A5201-04048	
AIR BLOCKER, Cover, fits into empty cell slot, REQUIRED FOR Integrity ONLY	A6866-04010	
Air Filter, Front Door, large one piece foam, pre-Integrity	A5201-00397	
Air Filter, Front Door, includes 1 piece foam element , 5 required per door, Integrity Only	A5201-00511	
Mfab, Inner Frame, Air Filter, Front	A5201-00356	
Mfab, Air Filter, Rear Door	A520100371	
BATTERY HOLDER, SBCH, for 3V battery	1402-2111	
RETAINER, Battery, SBCH, for 3V battery	1400-2112	
BATTERY, SBCH (single board computer hub), 3V 1.3-AHR, LI Manganese Dioxide	1420-0862	
BATTERY, Cell Board	1420-0386	
PCI I/O CARD Separator/Extractor	A3639-04024	

Table E-1 Superdome HP9000 and HP Integrity Superdome with PA-RISC & IPF Processors (Continued)

FRU DESCRIPTION	Replacement FRU Part No.	Exchange FRU Part No.
PCI I/O SLOT COVER	5001-7430	
Mfab, Filler Panel, Cable exit, EMI Panel	A5201-00246	
Pfab, Lossy Pad, used in REO cable ducts	A5201-00232	
Mfab, Honeycomb, EMI Panels - Top & Bottom	A5201-00028	
Mfab, EMI Blank I/O Chassis Filler Panel	A5201-00064	
Mfab, Feet Assembly kit, incl. Brackets, adjusters, feet and 16 attaching screws	A5201-70001	
Mfab, EMI Panel, Front Cell Board Chamber	A5201-00169	
Mfab, EMI Panel, Rear Cell Backplane Chamber	A5201-00422	
Mfab, REO DUCT COVER, non-power side	A5201-00231	
Mfab, REO DUCT COVER, power side	A5201-00235	
ASSY, Cabinet Attach, Horizontal (left/right cab attach)	A5201-00331	
ASSY, Cabinet Attach, Vertical (left/right cab attach)	A5201-00333	
Mfab, Cabinet Attach, post, rear, (left/right cab attach)	A5201-00335	
Mfab, Bracket, Cabinet Attach (left/right cab attach)	A5201-00467	
Screw, M6x1.0 10-MM-LG, (left/right cab attach)	0515-3210	
Screw, M6x1.0 12-MM-LG (left/right cab attach)	0515-0441	
Mfab, Front door opening limiter bracket	A5201-00431	
Mfab, Latch Catch, Rear door	A5201-00279	
Mfab, Bracket, Blower side panel lock	A5201-00268	
Mfab, PDCA blank panel	A5201-00440	
Mfab, Cosmetic, Front Door, Top, latch & key lock, pre Integrity	A5201-40005	
Mfab, Cosmetic, Front Door, Top, latch & key lock, color, Graphite, Integrity ONLY	A5201-40045	
Mfab, Cosmetic, Front Door, Bottom, pre Integrity	A5201-40006	
Mfab, Cosmetic, Front Door, Bottom, color, Graphite, Integrity ONLY	A5201-40046	
Mfab, Cosmetic, Cabinet Side Panel, without vertical lip, Pre-Integrity	A5201-04020	

Table E-1 Superdome HP9000 and HP Integrity Superdome with PA-RISC & IPF Processors (Continued)

FRU DESCRIPTION	Replacement FRU Part No.	Exchange FRU Part No.
Mfab, Cosmetic, Cabinet Side Panel, without vertical lip, color Graphite, Integrity ONLY	A5201-04060	
Mfab, Cosmetic, Cabinet Side Panel, with vertical lip,	A5201-04031	
Mfab, Cable Exit Panel, EMI	A5201-04050	
Mfab, Cosmetic, Cabinet Left Side Panel, with IOX cable access cutouts, pre-Integrity	A5201-04043	
Mfab, Cosmetic, Cabinet Left Side Panel, with IOX cable access cutouts, color Graphite, Integrity ONLY	A5201-04061	
Mfab, Cosmetic, Cabinet Right Side Panel, with IOX cable access cutouts, pre-Intehrity	A5201-04045	
Mfab, Cosmetic, Cabinet Right Side Panel, with IOX cable access cutouts, color, Graphite, Integrity ONLY	A5201-04057	
Pfab,Cosmetic, Side panel cable access, Block off plate, color, pre-Integrity	A5542-40001	
Pfab,Cosmetic, Side panel cable access, Block off plate, color, Graphite, Integrity ONLY	5042-8112	
ASSY, EMI clamp, REO cable, w/screws	A5861-04013	
ASSY, EMI clamp, USB cable, w/screws	A5861-04014	
ASSY, EMI clamp, blank plug, REO cable opening	A5861-00075	
ASSY, EMI clamp, blank plug, USB cable opening	A5861-00076	
Mfab, Cosmetic, Blower side panel, pre-Integrity	A5201-04019	
Mfab, Cosmetic, Blower side panel, color, Carbon, Integrity ONLY	A5201-04054	
Mfab, Cosmetic, Blower Front Panel, pre-Integrity	A5201-04018	
Mfab, Cosmetic, Blower Front Panel, color, Carbon, Integrity ONLY	A5201-04051	
Mfab, Cosmetic, Blower Rear Panel, pre-Integrity	A5201-04025	
Mfab, Cosmetic, Blower Rear Panel, color, Carbon, Integrity ONLY	A5201-04053	
Mfab, Cosmetic, Back Kicker, Left, pre-Integrity	A5201-00280	
Mfab, Cosmetic, Back Kicker, Left, color, Graphite, Integrity ONLY	A5201-00503	
Mfab, Cosmetic, Back Kicker, Middle, pre-Integrity	A5201-00261	

Table E-1 Superdome HP9000 and HP Integrity Superdome with PA-RISC & IPF Processors (Continued)

FRU DESCRIPTION	Replacement FRU Part No.	Exchange FRU Part No.
Mfab, Cosmetic, Back Kicker, Middle, color, Graphite, Integrity ONLY	A5201-00504	
Mfab, Cosmetic, Back Kicker, Right, pre-Integrity	A5201-00281	
Mfab, Cosmetic, Back Kicker, Right, color, Graphite, Integrity ONLY	A5201-00505	
Mfab, Latch Keeper, Front Door	A5201-00258	
ASSY, Front Door Metal Frame, pre-Integrity	A5201-04041	
ASSY, Front Door Metal Frame, color, Carbon, Integrity ONLY	A5201-04058	
Mfab, Hinge Brkt Front Mount	A5201-00259	
Mfab, Bracket, Side Panel Support	A5201-00274	
ASSY, Rear Door, includes door, , latch catch, stiffeners, brackets, & RFI strips, pre-Integrity	A5201-04022	
ASSY, Rear Door, includes door, , latch catch, stiffeners, brackets, & RFI strips, Integrity ONLY+C90	A5201-04059	
ASSY, Hinge, Rear Door	A5201-04024	
Mfab, Panel, Close-Out Top	A5201-00238	
Mfab, Panel, Closeout, Base	A5201-00076	
Mfab, Guide, PCI Chassis	A5201-00144	
Mfab. Support, I/O Chassis Mount	A5201-00168	
Mfab, Support, Bulkhead Front/Rear	A5201-00137	
ASSY, REO, Duct, NON-Power Side, incl. upper & lower cover	A5201-04013	
ASSY, REO, Duct, Power Side, incl. Upper & lower covers	A5201-04014	
ASSY, Horz. Mtng Plate, utilities tray & card cage, Incl HUCB	A5201-04042	
LOOPBACK CONNECTOR, RJ-45, used on empty CIO communications port	5065-5113	
LABEL, SD Cabinet power rating, overlay	A5201-84056	
NOMEX insulator, Cover, Self Sticking for 1.50" dia hole - Buss lug access hole's	6960-0311	
Filter, High Current/High Voltage, AC input	9135-5258	

Table E-1 Superdome HP9000 and HP Integrity Superdome with PA-RISC & IPF Processors (Continued)

FRU DESCRIPTION	Replacement FRU Part No.	Exchange FRU Part No.
CASTER-RGD PL 3-IN-Wheel	1492-0310	
STANDOFF-HEX, 188-IN-LG .187in-A/F CRS, qty 2 installed per D-sub connector on HUCB	0380-2057	
STANDOFF-HEX, 18-MM-L, SBC to SBCH	0380-4051	
STANDOFF-HEX, 16-MM-LG M3.0 x 0.5-THD SST	0380-4735	
SCREW, -MACHINE ASSY, M3 X 0.5 8MM-LG, qty 6 used to attach 48VDC/HKP brkt. Qty 14 used to attach HMIOB, qty 5 used to attach mounting brkt to UGUY, qty 6 used to attach mounting brkt to SBCH	0515-0372	
SCREW, 4.0 x 10 (for cabinet feet)	0515-0380	
SCREW, Machine, MSM 3.0 x 0.5 6mm LG	0515-0430	
SCREW, Machine Assembly, M4 x 0.7 45MM-LG	0515-0670	
SCREW-CAP, M10 x 1.5 80MM-LG HEX-HD, Bumper foot screw	0515-0824	
SCREW, Machine, M5 x 0.8 10MM LG	0515-2991	
SCREW, SMM 4.0 8 PCPNTX, frt & rr door hindge	0515-2113	
SCREW, Machine, M4 x 0.7 8mm-LG 90-DEG-FLH-HD	0515-1101	
SCREW, Machine, M4 x 8mm, T-15, bkpl, 48V Busbar	0515-0433	
TIE-WRAP, Velcro, REO cable management	5021-1125	
NUT-HEX-DBL-CHAM 12-32-THD .078-IN-THK	0535-0060	
NUT, Hex W/Ext-T-LKWR M5 x 0.8 4MM-THK, qty 1 used to attach ground lug from 48V Distribution Bus	0535-0066	
INSERT-NUT, Threaded, M4 x 0.7 2MM-LG	0590-1153	
INSERT-NUT, Threaded, M10.0	0590-2023	
INSERT-NUT, Threaded, STDF M4.0 x 0.7 18MM-LG	0590-2555	
CABLE TIE, .062-1.25dia., 1-WD NYL	1400-1154	
CABLE TIE,).87-dia .09-WD, NYL 6/6	1400-2150	
SCREW, Machine assembly, 4-40, .375-LG PAN-HD-TORX, qty 1 used to attach female guide	2200-1259	
Rubber Bumper, SD front & rear doors	0403-0549	

F Management Processor Commands

This Appendix summarizes the Management Processor commands. Notice that in the examples herein, MP is used as the command prompt. The term Guardian Service Processor has been changed to Management Processor, but some code already written uses the old term.

MP Command: AR

AR - Automatic partition Restart Configuration

- Access level—Administrator
- Scope—partition

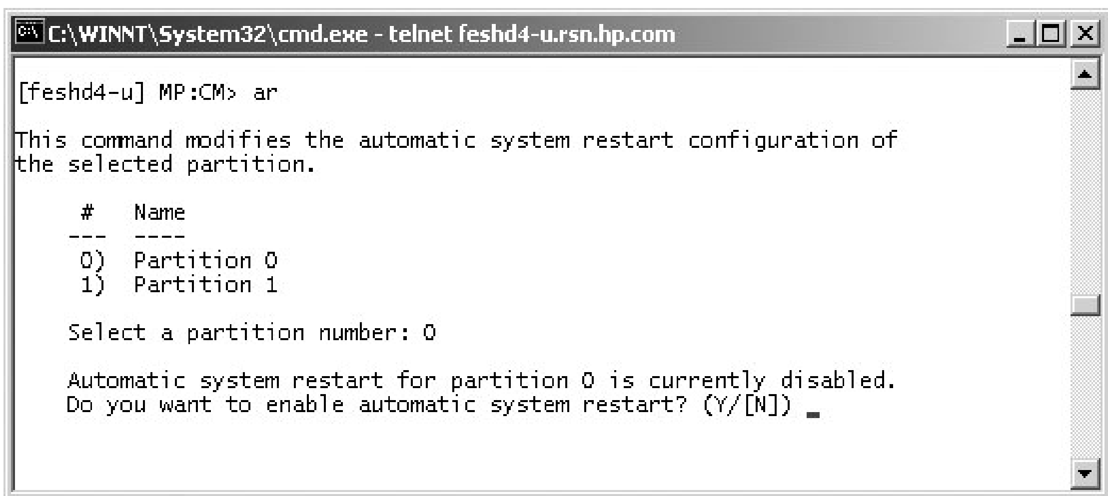
This command allows the operator to set the conditions and actions of the Automatic System Restart (ASR) feature. In the context of this command, system is synonymous with partition. The MP detects configured events and takes appropriate action, allowing a partition to reboot automatically without user intervention. By default, when it is enabled, ASR is performed on a chassis code with an alert level of 13. MP produces chassis codes when a timeout, started by an entity running on a partition, pops before the entity disables it.

ASR may be configured for several specific alert level values (e.g., alert level 12 and alert level 13). Using partition status, the MP can differentiate between time-outs due to normal system shutdown or system failures.

If there is an active session opened with the partition through the session path, the MP interrupts the session.

If the session was activated through an SE command, the MP Main Menu appears at the session client. System sessions opened through the console path are closed by the system.

Example F-1 AR Command



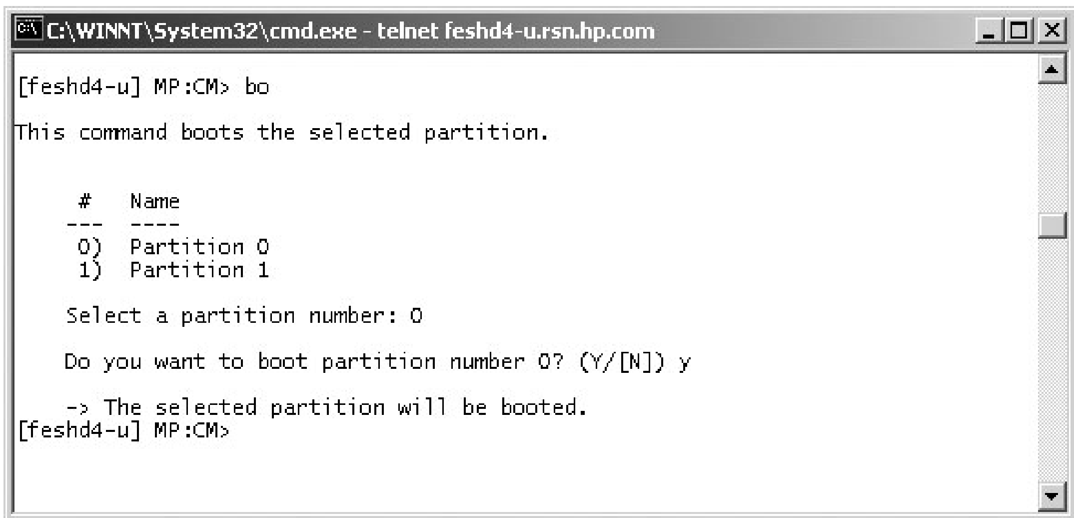
MP Command: BO

BO - Boot partition

- Access level—Single PD user
- Scope—partition

This command boots the specified partition. It ensures that all the cells assigned to the target partition have valid complex profiles and then releases Boot-Is-Blocked (BIB).

Example F-2 BO command



MP Command: CA

CA - Configure Asynchronous & Modem Parameters

- Access level—Operator
- Scope—Complex

This command allows the operator to configure the local and remote console ports. The parameters that can be configured are the baud rate, flow control, and modem type.

Example F-3 CA Command

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

```
[feshd4-u] MP:CM> ca

This command allows modification of the asychronous parameters.


WARNING: Changing the asynchronous parameters requires reboot of the MP
         for proper local operation.

    Do you want to modify the local rs232 port parameters? (Y/[N]) y

    Current Asynchronous Baud Rate is: 9600 bits/s
    Do you want to modify it? (Y/[N]) y
    Enter new Asynchronous Baud Rate (in bits/s):  9600
    New Asynchronous Baud Rate will be: 9600 bits/s
    Please confirm (Y/[N]) y

    -> Asynchronous Baud Rate will be updated.

    Current Flow Control is: Software
    Do you want to modify it? (Y/[N]) y
    Enter new Flow Control (Hardware/[Software]) :  s
    New Flow Control will be: Software
    Please confirm (Y/[N]) y

    -> Flow Control will be updated.


    Do you want to modify the modem parameters? (Y/[N]) y

    Current Modem Protocol is: CCITT
    Do you want to modify it? (Y/[N]) n

    Current Modem Baud Rate is: 9600 bits/s
    Do you want to modify it? (Y/[N]) n

    Current Flow Control is: Software
    Do you want to modify it? (Y/[N]) n


    -> Parameters have been updated.
[feshd4-u] MP:CM>
```

MP Command: CC

CC - Complex Configuration

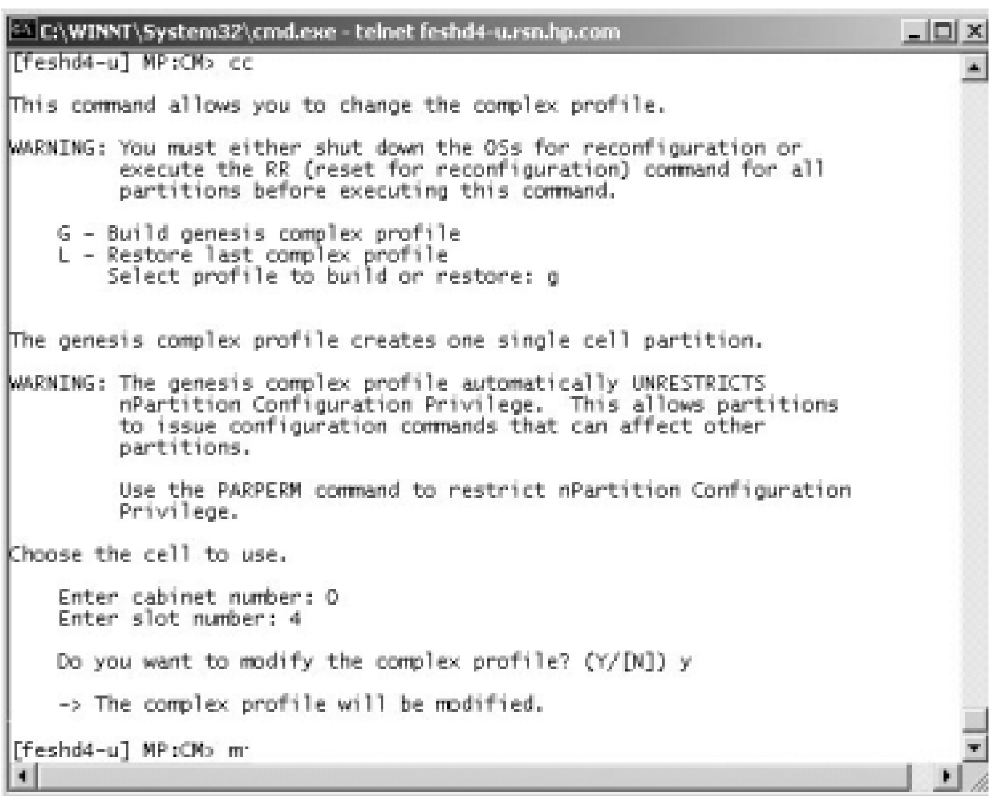
- Access level—Administrator
- Scope—Complex

This command performs an initial out of the box complex configuration. The system can be configured as either a single (user specified) cell in partition 0 (the genesis complex profile) or the last profile can be restored. The state of the complex prior to command execution has no bearing on the changes to the configuration. The user is responsible for ensuring that all other partitions are shut down before using this command. The use of the ID command could be required following the creation of the genesis complex profile. If the genesis profile is selected, then all remaining cells will be assigned to the free cell list.

NOTE This command does not boot any partitions. The user must boot the desired partition(s) using the BO command.

NOTE The best choice of cell to use in the genesis complex profile is one that has a bootable device attached.

Example F-4 CC Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> cc

This command allows you to change the complex profile.

WARNING: You must either shut down the OSs for reconfiguration or
         execute the RR (reset for reconfiguration) command for all
         partitions before executing this command.

    G - Build genesis complex profile
    L - Restore last complex profile
        Select profile to build or restore: g


The genesis complex profile creates one single cell partition.

WARNING: The genesis complex profile automatically UNRESTRICTS
         nPartition Configuration Privilege.  This allows partitions
         to issue configuration commands that can affect other
         partitions.

         Use the PARPERM command to restrict nPartition Configuration
         Privilege.

Choose the cell to use.

    Enter cabinet number: 0
    Enter slot number: 4

    Do you want to modify the complex profile? (Y/[N]) y

    -> The complex profile will be modified.

[feshd4-u] MP:CM> m
```

MP Command: CP

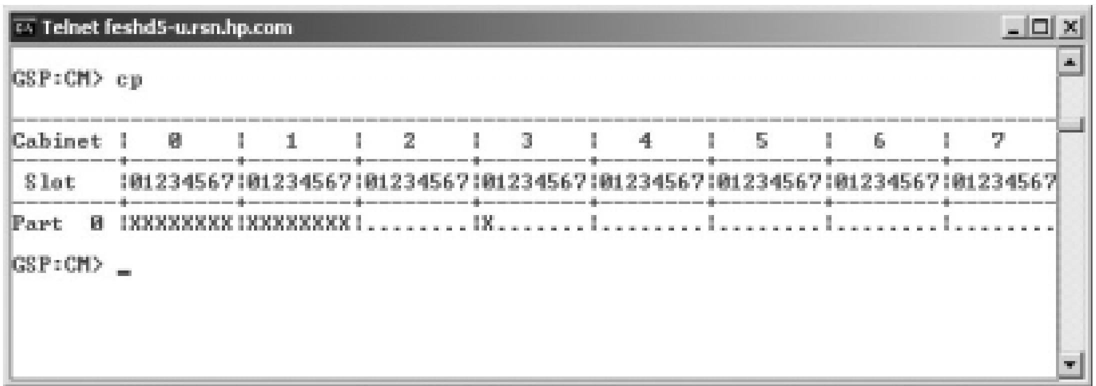
CP - Cells Assigned by Partition

- Access Level - Single Partition User
- Scope - Complex

The *cp* command displays a table of cells assigned to partitions and arranged by cabinets.

This is for display only, no configuration is possible with this command.

Example F-5 CP Command



MP Command: DATE

DATE Command - Set Date and Time.

- Access level—Administrator
- Scope—Complex

This command changes the value of the real time clock chip on the MP.

Example F-6 DATE

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

```
[feshd4-u] MP:CM> date

This command sets the date and time on the MP.

    Current date is: 07/07/03
    Do you want to modify it? (Y/[N]) y
    Enter new date (mm/dd/yy): 07/07/03
    New date will be: 07/07/03
    Please confirm (Y/[N]) y

    Current time is: 14:45:05
    Do you want to modify it? (Y/[N]) y
    Enter new time (hh:mm:ss): 15:49:45
    New time will be: 15:49:45
    Please confirm (Y/[N]) y
[feshd4-u] MP:CM>
```

MP Command: DC

DC - Default Configuration

- Access level—Administratrix
- Scope—Complex

This command resets some or all of the configuration parameters to their default values.

The clock setting is not effected by the DC command.

The example below shows the various parameters and their defaults.

Example F-7 DC Command

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

```
[feshd4-u] MP:CM> dc

This command allows you to reset parameters to their default settings.

Parameter                   Current Configuration      Default Configuration


MANAGEMENT PROCESSOR:
  Command Timeout           3                          3

ASYNCHRONOUS:
  Baud Rate                 9600                       9600
  Flow Control              Software(xon/xoff)         Software(xon/xoff)

MP SECURITY:
  Login TimeOut             1                          1
  Login Retries             3                          3
  Flow Control Timeout      5                          5

LAN:
  Customer LAN IP Address   15.99.49.133               192.168.1.1
  Customer LAN Host Name    feshd4-u                   gsp0
  Customer LAN Subnet Mask  255.255.248.0              255.255.255.0
  Customer LAN Gateway      15.99.49.254               192.168.1.1

  Private LAN IP Address    192.168.2.14               192.168.2.10
  Private LAN Host Name     priv-04                    priv-00
  Private LAN Subnet Mask   255.255.255.0              255.255.255.0
  Private LAN Gateway       192.168.2.10               192.168.2.10

MANUFACTURING:
  Manufacturing Mode        DISABLED                   DISABLED

MODEM:
  Modem Enable              ENABLED                    ENABLED
  Modem Protocol            CCITT                      CCITT
  Modem Baud Rate           9600                       9600
  Flow Control              Software(xon/xoff)         Software(xon/xoff)

ASR (Automatic System Restart):
  ASR Enabled/Disabled         Partitions              Default is
                                      1    1           all paritions
                            0....5....0....5           disabled
                            DDDDDDDDDDDDDDDD

    Do you wish to reset ALL parameters to their defaults? (Y/[N]) n
```

MP Command: DF

DF - Display FRUID

- Access level—Single Partition User
- Scope—Complex

This command displays the FRUID data of the specified FRU. FRU information for the SBC, BPS, and processors are “constructed,” because they do not have a FRU ID EEPROM. Because of this fact, the list of FRUs is different than the list presented in the WF command.

Example F-8 DF Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> df

This command displays the FRU ID information for the selected FRU.

    Do you want a specific FRU or a dump? ([S]/D) d

    A - ALL - All FRU devices in a cabinet.
    B - CPB - Cell power board.
    C - CIO - Core IO (contains PACI).
    D - DIMM
    G - UGUY
    H - SBCH
    I - IOB
    M - PRM - Processor module.
    O - IOPB - IO back plane power board.
    P - BPB - Main back plane power board.
    R - LSB/RSB
    S - SBC
    T - PDH - PDH daughtercard.
    W - CB - Cell board.
    X - BPS
        Select FRU : g

    Enter cabinet number: 0

The Entity you have selected is UGUY, in Cabinet 0

Retrieving information for 1 FRU(s)

1 of 1 FRU IDs were retrieved and valid


------------------------------------------------------------------------------
Fru Name         Part Name   Loc  Serial Num   Art Eng  Scan R Fru Spec.
  Manf Test Hist. 0  Manf Test Hist. 1  Manf Test Hist. 2  CC V  FR
  Manf Test Hist. 3  Manf Test Hist. 4  Manf Test Hist. 5  Spare
------------------------------------------------------------------------------
UGUY3            A5201-60204      SC40130200   B   XF01 0x1    BB500120
  b00100050840000000 b00100051180000000 000000000000000000 72 Y  A
  c0a100052220000000 000000000000000000 000000000000000000 0000

[feshd4-u] MP:CM>
```

MP Command: DI

DI - Disconnect Remote or LAN Console

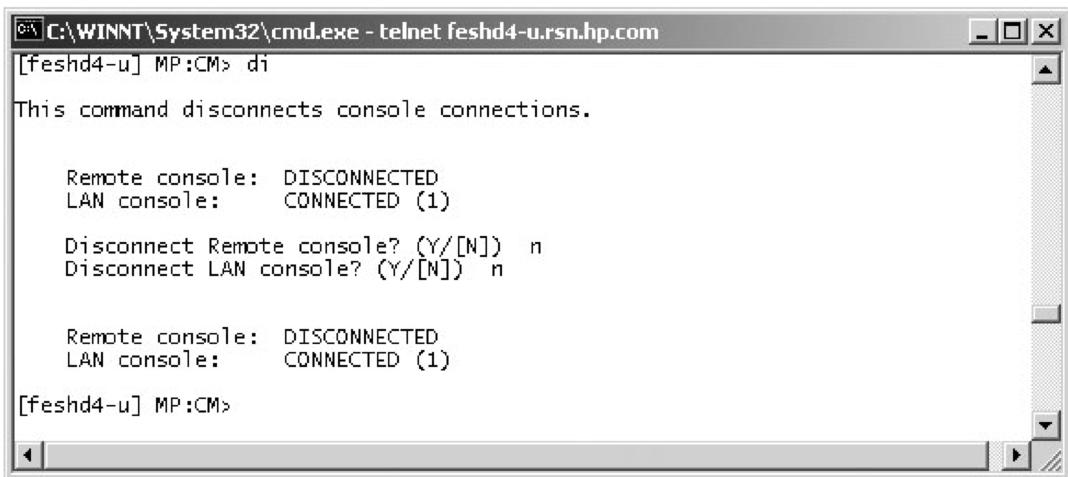
- Access level—Operator
- Scope—Complex

This command initiates separate remote console or LAN console disconnect sequences. For the remote console, the modem control lines are de-asserted, forcing the modem to hang up the telephone line. For the LAN console, the telnet connection is closed.

If the console being disconnected has an access mode of single connection (see ER command), then it is disabled, otherwise it remains enabled after the connection has been dropped.

The number after the LAN console status is the number of LAN connections.

Example F-9 DI Command



MP Command: HE

HE - Help Menu

- Scope—N/A
- Access level—Single PD user

This command displays a list of all MP commands available to the level of the MP access (Administrator, Operator, or Single PD user). The commands that are available in manufacturing mode will be displayed if the MP is in manufacturing mode.

In the following example, the MP is in manufacturing mode and as a result, the manufacturing commands are shown in the last screen. This example is from a pre-release version of MP firmware.

Example F-10 HE Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> he


Management Processor (MP) - FW Revision 14.6, May  6 2003 at 18:29:42

Utility Subsystem FW Revision Level: 14.6


The following are the service commands that are available

BO       : Boot a partition.
DF       : Display FRU information of an Entity.
MA       : Return to the Main menu.
MR       : Modem Reset
PCIOLAD  : Activate/Deactivate a PCI card.
PE       : Power entities on or off.
RE       : Reset entity.
RR       : Reset a partition for reconfiguration.
RS       : Reset a partition.
TC       : Send a TOC signal to a partition.
TE       : Broadcast a message to all users of the MP Command Handler.
VM       : Margin the voltage in a cabinet
WHO      : Display a list of MP connected users



Press q to quit or <CR> to continue...


Management Processor (MP) - FW Revision 14.6, May  6 2003 at 18:29:42

Utility Subsystem FW Revision Level: 14.6


The following are the status commands that are available

CP       : Display partition cell assignments
HE       : Display the list of available commands
IO       : Display IO chassis/cell connectivity
LS       : Display LAN connected console status
MS       : Display the status of the Modem
PS       : Display detailed power and hardware configuration status.
SYSREV   : Display revisions of all firmware entities in the complex.


Press q to quit or <CR> to continue...

Management Processor (MP) - FW Revision 14.6, May  6 2003 at 18:29:42

Utility Subsystem FW Revision Level: 14.6


The following are the system and access config commands that are available

AR       : Configure the Automatic System Restart
CA       : Configure Asynchronous and Modem parameters
CC       : Initiate a Complex Configuration
CP       : Display partition cell assignments
DATE     : Set the time and date
DC       : Reset parameters to default configuration
DI       : Disconnect Remote or LAN Console
ID       : Change certain stable complex configuration profile fields
IO       : Display IO chassis/cell connectivity
IT       : Modify command interface inactivity timeout
LC       : Configure LAN connections
LS       : Display LAN connected console status

Press q to quit or <CR> to continue...

Management Processor (MP) - FW Revision 14.6, May  6 2003 at 18:29:42

Utility Subsystem FW Revision Level: 14.6


The following are the system and access config commands that are available

PARPERM  : Enable/Disable Partition Reconfiguration
PD       : Modify default Partition for this login session.
RL       : Rekey Complex Profile Lock
SA       : Display and Set MP Remote Access
SO       : Configure Security Options and Access Contro
XD       : MP Diagnostics and Reset


[feshd4-u] MP:CM>
```

MP Command: ID

ID - Configure Complex Identification

- Access level—Operator
- Scope—Complex

This command configures the complex identification information. The complex identification information includes the following:

- model number
- model string
- complex serial number
- complex system name
- original product number
- current product number
- enterprise ID and diagnostic license

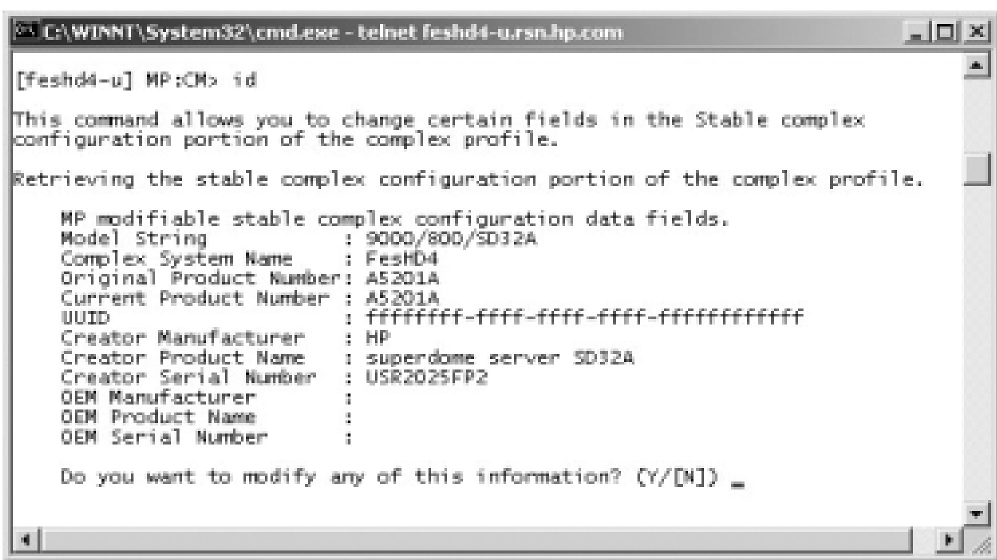
This command is similar to the SSCONFIG command in ODE.

The command is protected by an authentication mechanism. The MP generates a lock word, and the user must supply an authentication key which is dependent on the lock word. A fixed timeout of one minute protects against this command being entered inadvertently. This command has no effect if the timeout pops or the wrong authentication key is entered.

This command is inoperable until the MP has determined the golden complex profile.

When the machine is powered on for the first time, the CC command must be issued before the ID command can be used.

Example F-11 ID Command



MP Command: IT

IT - View / Configure Inactivity Timeout Parameters

- Access level—Operator
- Scope—Complex

This command sets the two inactivity time-outs.

The session inactivity timeout prevents a session to a partition to be inadvertently left opened, preventing other users to log onto a partition using this path. If the system session is hung or if the partition OS is hung, the IT command also prevents a session from being locked indefinitely i

The second timeout is a MP-Handler command timeout. This prevents a user from not completing a command and preventing other users from using the MP-Handler.

Neither timeout can be deactivated.

Example F-12 IT Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> it

    Current command interface inactivity timeout is set to 3 minutes.
    Do you want to modify this configuration? (Y/[N]) y
    Enter new command interface inactivity timeout (in minutes, <= 24*60): 4
    New command interface inactivity timeout will be: 4 minutes.
    Please confirm (Y/[N]) y

    -> Command interface inactivity timeout will be updated.
[feshd4-u] MP:CM>
```

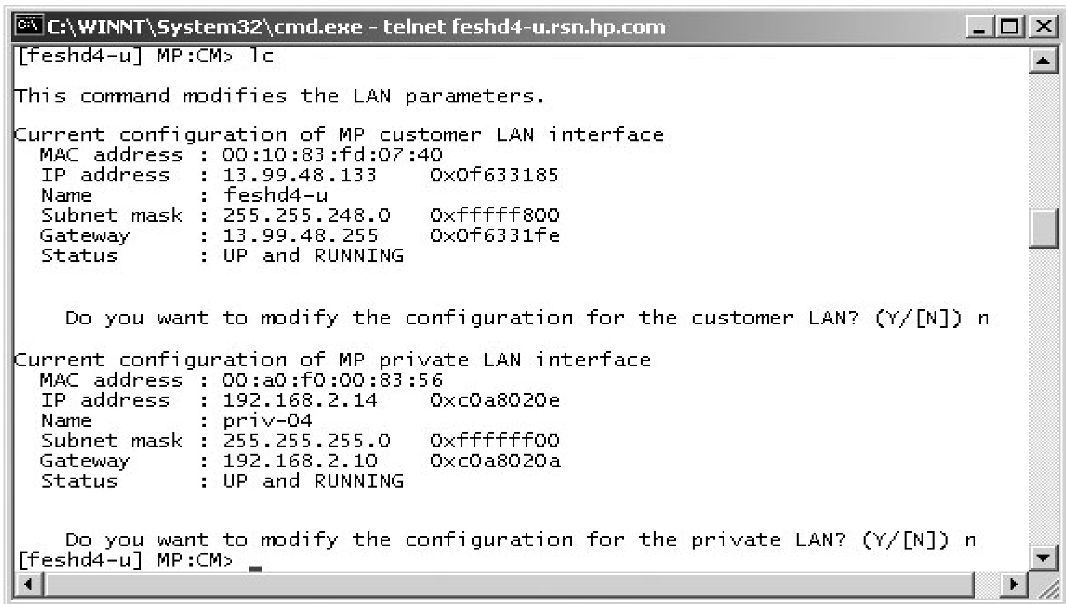
MP Command: LC

LC - LAN Configuration

- Access level—Administrator
- Scope—Complex

This command displays and modifies the LAN configurations. The IP address, Hostname, Subnet mask, and Gateway address can be modified with this command.

Example F-13 LC Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> lc

This command modifies the LAN parameters.

Current configuration of MP customer LAN interface
  MAC address : 00:10:83:fd:07:40
  IP address  : 13.99.48.133     0x0f633185
  Name        : feshd4-u
  Subnet mask : 255.255.248.0    0xfffff800
  Gateway     : 13.99.48.255     0x0f6331fe
  Status      : UP and RUNNING


    Do you want to modify the configuration for the customer LAN? (Y/[N]) n

Current configuration of MP private LAN interface
  MAC address : 00:a0:f0:00:83:56
  IP address  : 192.168.2.14     0xc0a8020e
  Name        : priv-04
  Subnet mask : 255.255.255.0    0xffffff00
  Gateway     : 192.168.2.10     0xc0a8020a
  Status      : UP and RUNNING


    Do you want to modify the configuration for the private LAN? (Y/[N]) n
[feshd4-u] MP:CM> _
```

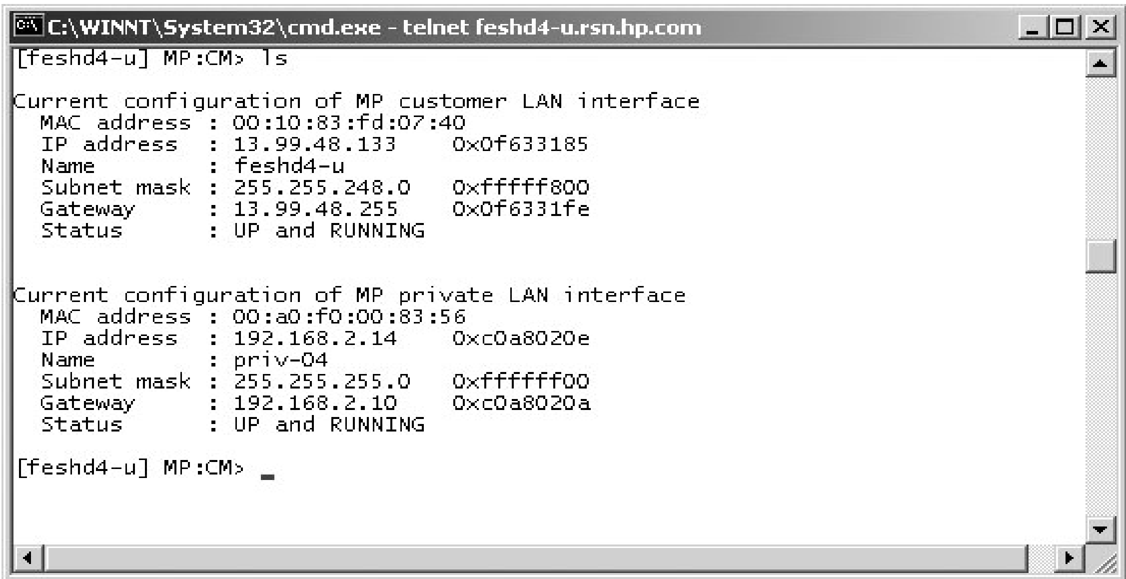
MP Command: LS

LS - LAN Status

- Access level—Single Partition User
- Scope—Complex

This command displays all parameters and current connection status of the LAN interface.

Example F-14 LS Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> ls

Current configuration of MP customer LAN interface
  MAC address : 00:10:83:fd:07:40
  IP address  : 13.99.48.133    0x0f633185
  Name        : feshd4-u
  Subnet mask : 255.255.248.0   0xfffff800
  Gateway     : 13.99.48.255    0x0f6331fe
  Status      : UP and RUNNING


Current configuration of MP private LAN interface
  MAC address : 00:a0:f0:00:83:56
  IP address  : 192.168.2.14    0xc0a8020e
  Name        : priv-04
  Subnet mask : 255.255.255.0   0xffffff00
  Gateway     : 192.168.2.10    0xc0a8020a
  Status      : UP and RUNNING

[feshd4-u] MP:CM> _
```

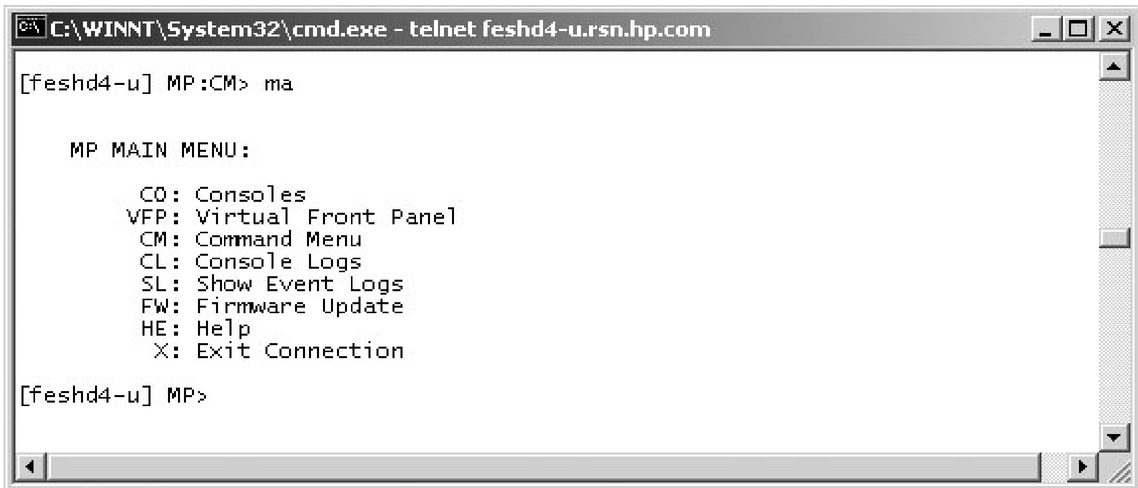
MP Command: MA

MA - Main Menu

- Access level—Single Partition User
- Scope—N/A

The command takes the specific user from the Command menu and returns the user to the main menu. Only the user that enters the command is returned to his private main menu.

Example F-15 MP Main Menu



MP Command: MFG

MFG- Enter Manufacturing Mode

- Access level—Administrator
- Scope—Complex

NOTE This command is reserved for HP manufacturing and is available for internal use only. Its use is protected by an authentication mechanism based on the algorithm currently used by workstation manufacturing.

The MP generates a lock word, and the user must supply an authentication key which is dependent on this lock word. A fixed timeout of one minute protects against inadvertent entry of this command. If the timeout pops or the wrong authentication key has been entered, the command has no effect.

If the correct authentication key is entered, the manufacturing mode is entered. This gives access to an additional set of MP commands. *The command must again be invoked to exit manufacturing mode. If the manufacturing mode is not exited, it is available to the next person that accesses the command menu*.

These commands show up in the HE command output when in manufacturing mode only.

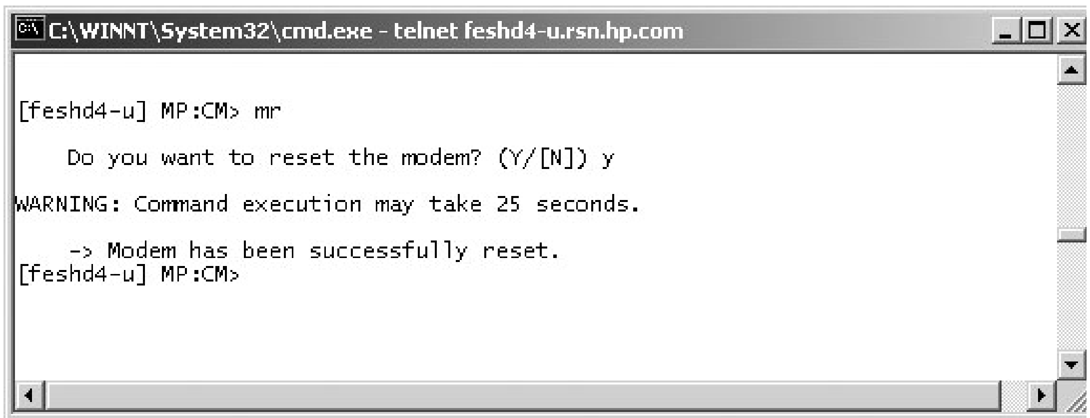
MP Command: MR

MR - Modem Reset

- Access level—Operator
- Scope—Complex

This command sends an *AT Z* command to the system modem connected to the SBC. The initialization results can be viewed by way of the MS command. This command does not reset modems connected to the PACI-Serial ports.

Example F-16 MR Command



MP Command: MS

MS - Modem Status

- Access level—Single Partition User
- Scope—Complex

This command displays the result of the system modem's power-on selftest and shows the state of the modem lines. Each time the system is powered-on, the MP command performs a selftest and then reads a modem register containing the results of the last selftest.

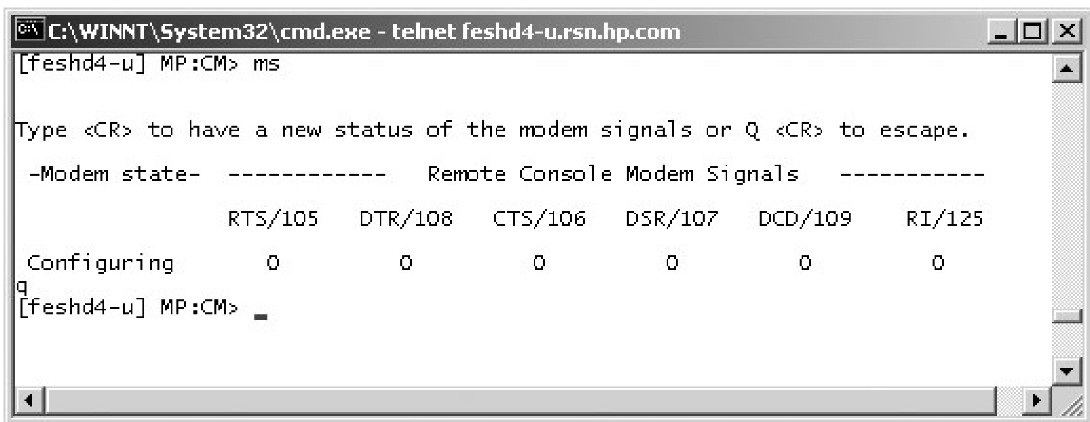
The modem selftest register is read by using the AT&T8 command. The result displayed is exactly the same as the one returned by the modem. No analysis of the result is done.

If the MP is unable to complete the modem access (auto-identification and self-test register reading) before the MS command is performed, the following message will be displayed:

`Modem initialization not done. Use MR to complete it.`

The MS command also displays the state of the modem lines. This display is updated when the operator enters a Carriage Return. The command displays the current state of the status signals (DCD, CTS, DSR, RI) and the last state of the control signals (FS, GPO, DTR, RTS) as set by the firmware.

Example F-17 MS Command



See also: MR

MP Command: PD

PD - Set Default Partition

- Access level—Operator
- Scope—Complex

This command sets the default partition. If a default partition already exists, then this command overrides the previously defined partition. Setting the default partition prevents the user from being forced to enter a partition in commands that require a partition for their operation. For example, this prevents a user from accidentally TOCing the wrong partition.

A default partition is automatically set for users who are assigned the Single Partition User access level when they login into the MP handler. A user assigned the Single Partition User access level can not change the default partition.

When users of the Administrator or Operator levels log in, their default partition will be set to an invalid partition. The default partition for users of these access levels is maintained independently for each connection. When the user logs out of the MP handler, the default partition setting is not stored in non-volatile storage.

Example F-18 PD Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

[feshd4-u] MP:CM> pd

    The default partition is -1.
    (This partition number currently does not exist.)
    Change default partition? (Y/[N]) y
    Enter new default partition: 0
    The default partition will be 0.
    Named: Partition 0
    Do you want to keep this change? (Y/[N]) y
[feshd4-u] MP:CM>
```

See also: RE, SO

MP Command: PS

PS - Power and Configuration Status

- Access level—Single Partition User
- Scope—Cabinet

This command displays the status of the specified hardware. This command adds new information from previous versions of the PS command in other systems.

The user can retrieve a summary or more detailed information on one of the following: a cabinet, a cell, a core IO, and the MP.

Example F-19 PS Command

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

```
[feshd4-u] MP:CM> ps

This command displays detailed power and hardware configuration status.

The following MP bus devices were found:
+----+-----+-----------+-----------------+-----------------------------------+
|    |     |           |                 |              Core IOs             |
|    |     |           |                 | IO Bay | IO Bay | IO Bay | IO Bay |
|    |     |   UGUY    |      Cells      |   0    |   1    |   2    |   3    |
|Cab.|     |           |                 |IO Chas.|IO Chas.|IO Chas.|IO Chas.|
| #  | MP  | CLU | PM  |0 1 2 3 4 5 6 7  |0 1 2 3 |0 1 2 3 |0 1 2 3 |0 1 2 3 |
+----+-----+-----+-----+-----------------+--------+--------+--------+--------+
|  0 |  *  |  *  |  *  |*       *        |  *   * |        |        |        |
You may display detailed power and hardware status for the following items:

    B - Cabinet (UGUY)
    C - Cell
    G - MP
    I - Core IO
        Select Device: b

    Enter cabinet number: 0

HW status for SD32A compute cabinet #0: FAILURE DETECTED
Power switch: on;  Power: enabled, good;  Door: open
Fan speed: high;  Temperature state: normal
Redundancy state: fans and blowers redundant, BPSs redundant

                      | Main BP|                  |    IO Backplanes    |
                      | Power  |                  | IO Bay 0 | IO Bay 1 |
               | Main | Boards |      Cells       | Chassis  | Chassis  |
               | BP   | 0 1 2  | 0 1 2 3 4 5 6 7  | 0 1 2 3  | 0 1 2 3  |
+--------------+------+--------+------------------+----------+----------+
 Populated     |  *   | * * *  | *       *        |  *   *   |       *  |
 Power Enabled |  *   | * * *  | *       *        |  *   *   |       *  |
 Powered On    |  *   | * * *  | *       *        |  *   *   |          |
 Power Fault   |      |        |                  |          |          |
 Attention LED |      |        |                  |          |          |

                            | Cabinet |    IO     |
            |     BPS       | Blowers |   Fans    |
            | 0 1 2 3 4 5   | 0 1 2 3 | 0 1 2 3 4 |
+-----------+---------------+---------+-----------+
  Populated | * * * * * *   | * * * * | * * * * * |
  Failed    |               |         |           |

               -- Press <CR> to continue, or 'Q' to Quit --

Voltage margin: nominal;  Clock margin: nominal

              CLU Status    PM Status    CLU POST
UGUY LEDs:    ***_____      ****         ____

                                  | Parity    | Connected  | Location       |
 Flex connections | Connected     | error     | to cabinet | (Upper/Lower)  |
+-----------------+---------------+-----------+------------+----------------+
  XBC [7-0]       | NYNYNYNY      | NNNNNNNN  | 00000000   | N/A            |
  RC  [7-0]       | NNNNNNNN      | NNNNNNNN  | 00000000   | LLLLLLLL       |

PM  firmware rev 14.4, time stamp: FRI APR 25 14:33:38 2003
CLU firmware rev 14.2, time stamp: WED APR 16 16:36:42 2003

[feshd4-u] MP:CM>
```

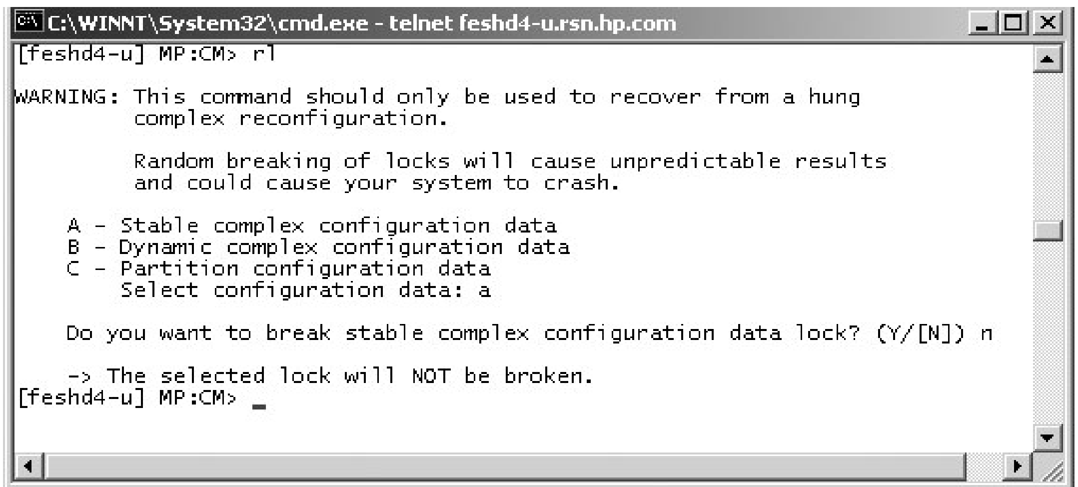
MP Command: RL

RL - Re-key Complex Profile Lock

- Access level—Operator
- Scope—Complex

This command re-keys the complex profile lock. It should only be used to recover from the error caused by the holder of the lock terminating before releasing the complex profile lock. It invalidates any outstanding key to the complex profile lock. There are up to 66 complex profile locks: one for each partition in section C of plus one key each for the A and B sections of the Complex Profile. The Default Partition is the default when prompting the user for which lock to re-key.

Example F-20 Re-key lock for partition 3



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> rl

WARNING: This command should only be used to recover from a hung
         complex reconfiguration.

         Random breaking of locks will cause unpredictable results
         and could cause your system to crash.

    A - Stable complex configuration data
    B - Dynamic complex configuration data
    C - Partition configuration data
        Select configuration data: a

    Do you want to break stable complex configuration data lock? (Y/[N]) n

    -> The selected lock will NOT be broken.
[feshd4-u] MP:CM> _
```

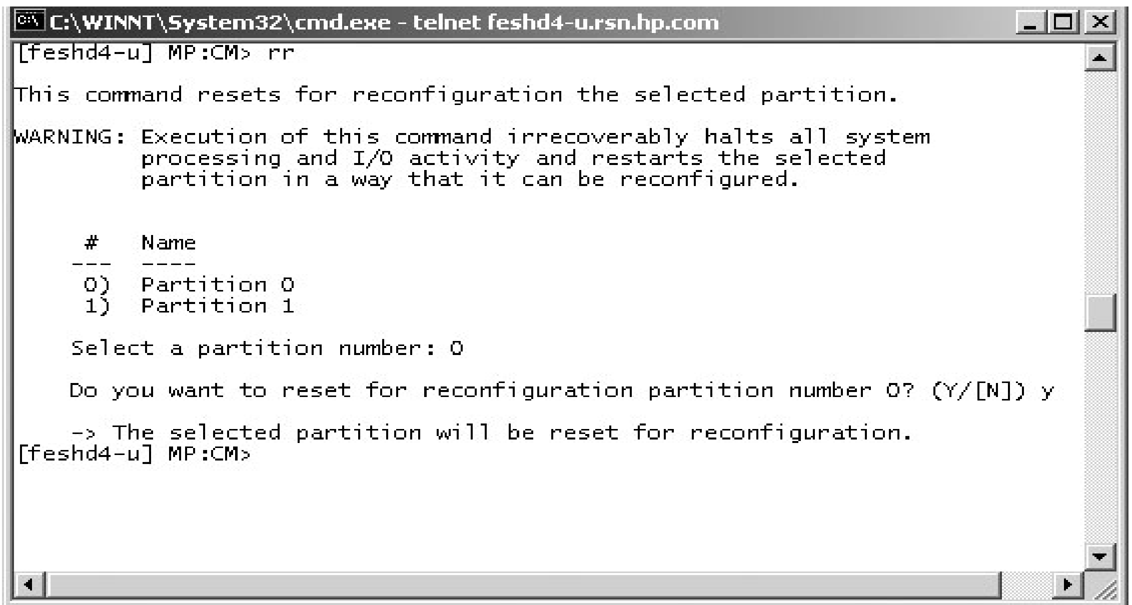
MP Command: RR

RR - Reset Partition for Re-configuration

- Access level—Single Partition User
- Scope—Partition

This command resets the specified partition but does not automatically boot it. The utility system resets each cell that is a member of the specified partition.If the user is either Administrator or Operator, a choice of which partition will be offered.

Example F-21 RR Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> rr

This command resets for reconfiguration the selected partition.

WARNING: Execution of this command irrecoverably halts all system
         processing and I/O activity and restarts the selected
         partition in a way that it can be reconfigured.


     #   Name
    ---  ----
     0)  Partition 0
     1)  Partition 1

    Select a partition number: 0

    Do you want to reset for reconfiguration partition number 0? (Y/[N]) y

    -> The selected partition will be reset for reconfiguration.
[feshd4-u] MP:CM>
```

MP Command: RS

RS - Reset Partition

- Access level—Single PD user
- Scope—Partition

This command resets and boots the specified partition. The utility system resets each cell that is a member of the specified partition. Once all cells have completed reset, the partition is booted. If the user is either Administrator or Operator, a choice of which partition is offered.

Example F-22 RS Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> rs

This command resets the selected partition.

WARNING: Execution of this command irrecoverably halts all system
         processing and I/O activity and restarts the selected
         partition.


     #   Name
    ---  ----
     0)  Partition 0
     1)  Partition 1

    Select a partition number: 0

    Do you want to reset partition number 0? (Y/[N]) y

    -> The selected partition will be reset.
[feshd4-u] MP:CM>
```

MP Command: SO

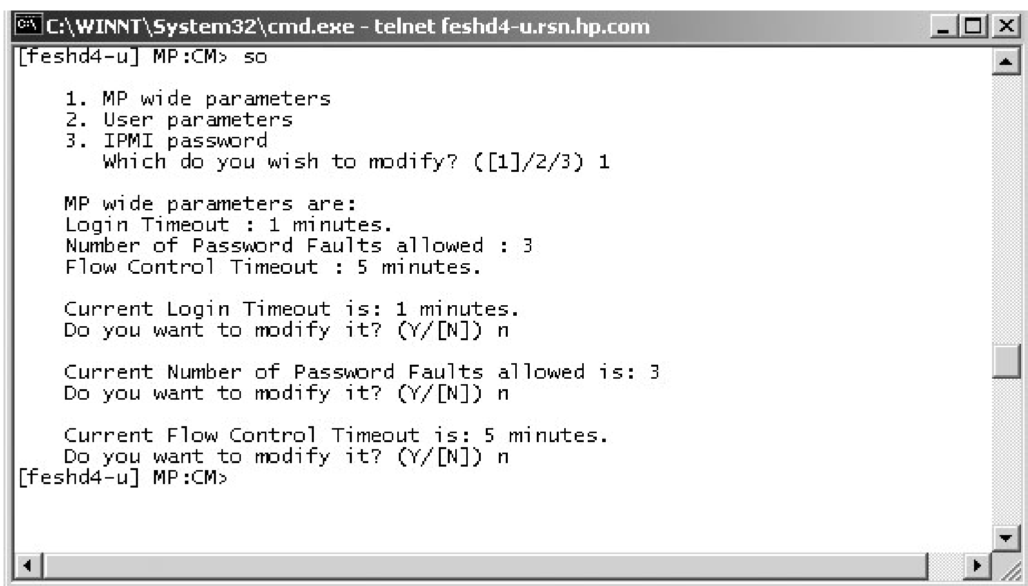
SO - Security Options and Access Control Configuration

- Access level—Administrator
- Scope—Complex

This command modifies the security options and access control to the MP handler. The parameters that can be modified are:

- Login timeout
- Number of password faults allowed
- Flow control time-outs
- User parameters:
  - — User name
  - — Organization name
  - — Access level
  - — Mode
  - — User state

Example F-23 SO Command



```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> so

    1. MP wide parameters
    2. User parameters
    3. IPMI password
       Which do you wish to modify? ([1]/2/3) 1

    MP wide parameters are:
    Login Timeout : 1 minutes.
    Number of Password Faults allowed : 3
    Flow Control Timeout : 5 minutes.

    Current Login Timeout is: 1 minutes.
    Do you want to modify it? (Y/[N]) n

    Current Number of Password Faults allowed is: 3
    Do you want to modify it? (Y/[N]) n

    Current Flow Control Timeout is: 5 minutes.
    Do you want to modify it? (Y/[N]) n
[feshd4-u] MP:CM>
```

MP Command: TC

TC - TOC Partition

- Access level—Single Partition User
- Scope—Partition

This command transfers the control (TOC) of the specified partition. The SINC on each cell in the specified partition asserts the sys_init signal to Dillon.

Example F-24 TC Command

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

```
[feshd4-u] MP:CM> tc

This command TOCs the selected partition.

WARNING: Execution of this command irrecoverably halts all system
         processing and I/O activity and restarts the selected
         partition.


     #   Name
    ---  ----
     0)  Partition 0
     1)  Partition 1

    Select a partition number: 0

    Do you want to TOC partition number 0? (Y/[N]) y

    -> The selected partition will be TOCed.
[feshd4-u] MP:CM>
```

MP Command: TE

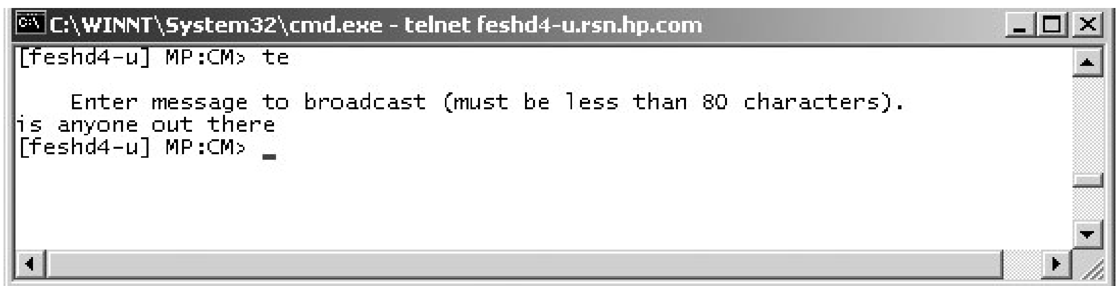
TE - Tell

- Access level—Single Partition User
- Scope—Complex

This command treats all characters following the TE as a message that is broadcast when the **<CR>** is pressed. The message size is limited to 80 characters. Any extra characters are not broadcast. Also, any message that is written is not entered into the console log.

NOTE All users connected to the MP handler will receive the message irrespective of what Partition the user sending the message has access to.

Example F-25 TE Command



MP Command: VM

VM - Voltage Margin

- Access level—Single Partition User
- Scope—Cabinet

The command adjusts the voltage of all marginable supplies within a range of +/- 5%

No reset is required for the command to become effective.

Example F-26 VM Command

```
C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com
[feshd4-u] MP:CM> vm

This command allows margining of a cabinet's voltage.

Cabinet 0's voltage margin is Nominal

    Enter cabinet number: 0

    N - Nominal
    H - High
    L - Low
        Select Margin Level: n

    Do you want to margin the voltage in cabinet 0? (Y/[N]) y

    -> The cabinet voltage will be margined.
[feshd4-u] MP:CM> _
```

MP Command: WHO

WHO - Display List of Connected Users

- Access level—Single Partition User
- Scope—Complex

This command displays the login name of the connected console client user and the port on which they are connected. For LAN console clients the remote IP address is displayed.

Example F-27 WHO Command

C:\WINNT\System32\cmd.exe - telnet feshd4-u.rsn.hp.com

```
[feshd4-u] MP:CM> who


User Login         Port Name      IP Address

CSIL                 LAN         18. 59. 81. 11
CSIL                 LAN         18. 59. 81. 11


[feshd4-u] MP:CM>
```

MP Command: XD

XD - Diagnostic and Reset of MP

- Access level—Operator
- Scope—Complex

This command tests certain functions of the SBC and SBCH boards. Some of the tests are destructive and should not be performed on a system running the operating system.

Example F-28 XD Command

```
C:\WINNT\System32\cmd.exe

[feshd4-u] MP:CM> xd

    Non destructive tests:
        1. Parameters checksum
        2. Ping
           Type R to reset the MP or Q to quit the diagnostic menu.

    Enter your choice: 1

    Test result is: PASS

    Non destructive tests:
        1. Parameters checksum
        2. Ping
           Type R to reset the MP or Q to quit the diagnostic menu.

    Enter your choice: 2

    Enter IP address: 192.168.2.14

    Test result is: FAIL

    Non destructive tests:
        1. Parameters checksum
        2. Ping
           Type R to reset the MP or Q to quit the diagnostic menu.

    Enter your choice: r

Connection to host lost.

C:\>
```

G JUST Exploration Tool

The JTAG Utility for Scan Tests (JUST) Exploration Tool, or JET, collects system information for each hp Integrity Superdome or hp 9000 Superdome on a network and places it in files for use by other scan tools. JET gathers configuration data by executing a series of queries targeted at the MP and the CLU portion of the UGUY board.

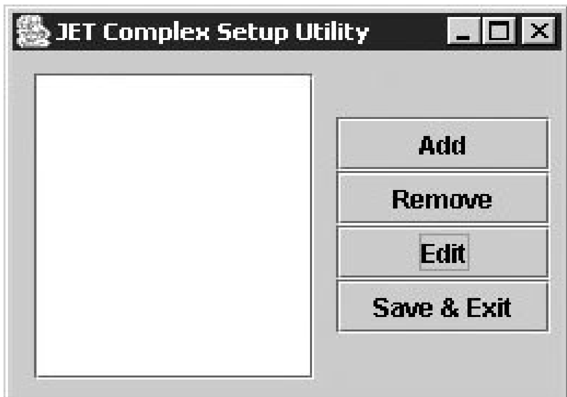
Jet Set-Up Utility (for PC SMS Only)

To run JET on the installed server from the PC-based SMS, the JET utility must first be run so that JET the can recognize the server's IP address.

Step 1. From the Start menu, select RUN.

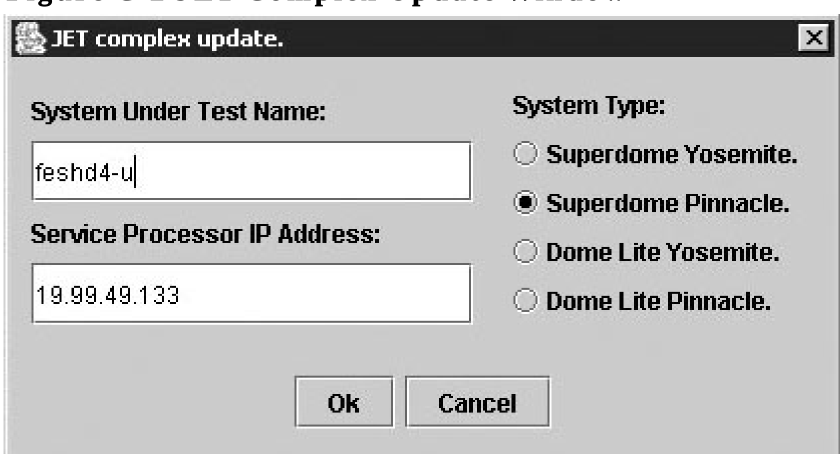
Step 2. Enter the path to the JET utility. The following window appears:

Figure G-1 JET Set-UP Utility



Step 3. Select Add. The following window appears:

Figure G-2 JET Complex Update Window



Step 4. Enter the server name and IP address and click OK. The server name is recorded in the initial utility window (Figure G-1).

Step 5. Click Save & Exit to store the server for the utility.

Command Line Arguments

JET supports the following command line arguments:

Table G-1 Command Line Arguments

Argument	Parameters	Description
-v		Prints version information then exit.
-d	<debug level>	Specifies JET debug level. This parameter overrides any other specification of debug level.
-h		(lower case h) Prints short help page.
-f	<complex name> <node number>	Causes a forced disconnect from the specified node in the specified complex.
-i		Enter interactive mode.
-o		Outputs the old format *complex.cfg* configuration file. The default is to output the new format *cplx.cfg* file.
-r		Performs a JTAG reset on each path before scanning the ID rings. It takes the field <on/off>, with ON enabling JTAGE resets and OFF disabling the. the default is ON.

These options are specified using the following format:

jet [-v] [-h] [-d <debug level>] [-f <complex name> <node number>] [-i]

JET Interactive Mode

The interactive mode allows the user to run JET, display the current system configuration, and to update that configuration. To run in the interactive mode, enter ***jet -i*** at the prompt. When entering the interactive mode, the following is displayed:

Figure G-3 Interactive Mode Display

```
% jet -i

JET Interactive MAIN MENU!

  Select from the following options.
    1) Run JET.
    2) Display current configuration data.
    3) Update configuration.
    X) Exit

  Enter selection:
```

Select one of the options from the menu.

JET Run Menu

By entering a 1 at the main JET menu, it is placed in the run mode. Figure G-4 shows the run menu options. You may either interrogate all complexes of an individual complex.

Figure G-4 JET Run Display

```
JET Interactive RUN MENU!

  Select from the following options.

    1) Interrogate all complexes.
    2) Select a complex to interrogate.
    X) Return to previous menu.

  Enter selection:
```

When interrogating a single complex (entering option 2), the following is displayed:

Figure G-5 Individual Complex Interrogation Menu

```
JET Interactive COMPLEX SELECTION MENU!

  Select from the following options.

    1) feynman-s.
    X) Return to previous menu.

  Enter selection: 1
```

In this case, the only complex available is feynman-s. If other complexes were available, they would be listed as well. shows a typical complex configuration.

Figure G-6 Typical Complex Configuration Dump

```
Links for complex feynman-s:
DNA to REO links: 4
TOGO flex links: 12
```

JET Current Configuration Display Menu

To view the current complex configuration, from the JET main menu, enter 2 from the JET main menu as shown in Figure G-7.

Figure G-7 Interactive Mode Display

```
% jet -i

JET Interactive MAIN MENU!

  Select from the following options.
    1) Run JET.
    2) Display current configuration data.
    3) Update configuration.
    X) Exit

  Enter selection:
```

Figure G-8 Display Current Configuration Menu

```
JET Interactive COMPLEX SELECTION MENU!

  Select from the following options.
    1) feynman-s.
    X) Return to previous menu.
  Enter selection: 1
```

Enter the number listed in the menu for the desired complex. In this example only one complex is online. Selecting a complex yields a typical menu as shown in Figure G-9.

Figure G-9 Configuration Display Options Menu

```
JET Interactive DISPLAY SELECTION!

  Select from the following options.
    1) Display all nodes.
    2) Select a specific node.
    X) Return to previous menu.

  Enter selection: 1
```

Selecting all nodes (option 1) displays a menu that lists of all the nodes in the complex as shown in Figure G-10.

Figure G-10 Typical List of Nodes

```
JET Interactive NODE SELECTION MENU!

  Select from the following options.

    0) Node number 0.
    1) Node number 1.
    2) Node number 2.
    3) Node number 3.
    4) Node number 4.
    5) Node number 5.
    6) Node number 6.
    7) Node number 7.
    8) Node number 8.
    9) Node number 9.
    10) Node number 10.
    11) Node number 11.
    12) Node number 12.
    13) Node number 13.
    14) Node number 14.
    15) Node number 15.
    X) Return to previous menu.

  Enter selection: 0
```

Entering a node number yields a display that is typified in Figure G-11.

Figure G-11 Typical Node Configuration Display

```
------------------------------------------------------------------------

feynman-s  Arch code: 80
  Node:  0     PRESENT          UP_TO_DATE
    Board:     MAIN BACKPLANE   0   PRESENT         UP_TO_DATE    HLSB2
    Board:     HMIOB            0   PRESENT         UP_TO_DATE    HMIOB
    Board:     HMIOB            1   PRESENT         UP_TO_DATE    HMIOB
    Board:     HIOB             1   PRESENT         UP_TO_DATE    GXIOB3
    Board:     HIOB             3   PRESENT         UP_TO_DATE    HIOB2
    Board:     HIOB             5   PRESENT         UP_TO_DATE    HIOB2
    Board:     HIOB             7   PRESENT         UP_TO_DATE    GXIOB3
    Board:     CELL             0   PRESENT         UP_TO_DATE    OCB2-IPF
    Board:     CELL             1   NOT PRESENT     UP_TO_DATE
    Board:     CELL             2   NOT PRESENT     UP_TO_DATE
    Board:     CELL             3   PRESENT         UP_TO_DATE    OCB2-IPF
    Board:     CELL             4   NOT PRESENT     UP_TO_DATE
    Board:     CELL             5   NOT PRESENT     UP_TO_DATE
    Board:     CELL             6   NOT PRESENT     UP_TO_DATE
    Board:     CELL             7   NOT PRESENT     UP_TO_DATE
    Board:     PDH Card         0   PRESENT         UP_TO_DATE    OPDH
    Board:     PDH Card         1   NOT PRESENT     UP_TO_DATE
    Board:     PDH Card         2   NOT PRESENT     UP_TO_DATE
    Board:     PDH Card         3   PRESENT         UP_TO_DATE    OPDH
    Board:     PDH Card         4   NOT PRESENT     UP_TO_DATE
    Board:     PDH Card         5   NOT PRESENT     UP_TO_DATE
    Board:     PDH Card         6   NOT PRESENT     UP_TO_DATE
    Board:     PDH Card         7   NOT PRESENT     UP_TO_DATE
    Board:     Slot 0 CPU       0   PRESENT         UP_TO_DATE    CPUMOD
    Board:     Slot 0 CPU       1   NOT PRESENT     UP_TO_DATE
    Board:     Slot 0 CPU       2   NOT PRESENT     UP_TO_DATE
    Board:     Slot 0 CPU       3   PRESENT         UP_TO_DATE    CPUMOD
    Board:     Slot 0 CPU       4   NOT PRESENT     UP_TO_DATE
    Board:     Slot 0 CPU       5   NOT PRESENT     UP_TO_DATE
    Board:     Slot 0 CPU       6   NOT PRESENT     UP_TO_DATE
    Board:     Slot 0 CPU       7   NOT PRESENT     UP_TO_DATE
    Board:     Slot 1 CPU       0   PRESENT         UP_TO_DATE    CPUMOD
    Board:     Slot 1 CPU       1   NOT PRESENT     UP_TO_DATE
    Board:     Slot 1 CPU       2   NOT PRESENT     UP_TO_DATE
    Board:     Slot 1 CPU       3   PRESENT         UP_TO_DATE    CPUMOD
    Board:     Slot 1 CPU       4   NOT PRESENT     UP_TO_DATE
```

```
    Board:     Slot 1 CPU       5   NOT PRESENT     UP_TO_DATE
    Board:     Slot 1 CPU       6   NOT PRESENT     UP_TO_DATE
    Board:     Slot 1 CPU       7   NOT PRESENT     UP_TO_DATE
    Board:     Slot 2 CPU       0   PRESENT         UP_TO_DATE    CPUMOD
    Board:     Slot 2 CPU       1   NOT PRESENT     UP_TO_DATE
    Board:     Slot 2 CPU       2   NOT PRESENT     UP_TO_DATE
    Board:     Slot 2 CPU       3   PRESENT         UP_TO_DATE    CPUMOD
    Board:     Slot 2 CPU       4   NOT PRESENT     UP_TO_DATE
    Board:     Slot 2 CPU       5   NOT PRESENT     UP_TO_DATE
    Board:     Slot 2 CPU       6   NOT PRESENT     UP_TO_DATE
    Board:     Slot 2 CPU       7   NOT PRESENT     UP_TO_DATE
    Board:     Slot 3 CPU       0   PRESENT         UP_TO_DATE    CPUMOD
    Board:     Slot 3 CPU       1   NOT PRESENT     UP_TO_DATE
    Board:     Slot 3 CPU       2   NOT PRESENT     UP_TO_DATE
    Board:     Slot 3 CPU       3   PRESENT         UP_TO_DATE    CPUMOD
    Board:     Slot 3 CPU       4   NOT PRESENT     UP_TO_DATE
    Board:     Slot 3 CPU       5   NOT PRESENT     UP_TO_DATE
    Board:     Slot 3 CPU       6   NOT PRESENT     UP_TO_DATE
    Board:     Slot 3 CPU       7   NOT PRESENT     UP_TO_DATE
    Board:     CORE IO          1   NOT PRESENT     UP_TO_DATE
    Board:     CORE IO          3   NOT PRESENT     UP_TO_DATE
    Board:     CORE IO          5   NOT PRESENT     UP_TO_DATE
    Board:     CORE IO          7   NOT PRESENT     UP_TO_DATE

  Link: source node = 0   INPUT-OUTPUT    CELL0_REO_IN
  Link: source node = 0   INPUT-OUTPUT    CELL0_REO_OUT
  Link: source node = 0   INPUT-OUTPUT    CELL3_REO_IN
  Link: source node = 0   INPUT-OUTPUT    CELL3_REO_OUT
  Link: source node = 0   BACKPLANE       TOGO_FLEX_0
  Link: source node = 0   BACKPLANE       TOGO_FLEX_3
  Link: source node = 0   BACKPLANE       TOGO_FLEX_6
  Link: source node = 0   BACKPLANE       TOGO_FLEX_5
  Link: source node = 1   BACKPLANE       TOGO_FLEX_7
  Link: source node = 1   BACKPLANE       TOGO_FLEX_4
  Link: source node = 1   BACKPLANE       TOGO_FLEX_0
  Link: source node = 1   BACKPLANE       TOGO_FLEX_2
  Link: source node = 1   BACKPLANE       TOGO_FLEX_6
  Link: source node = 1   BACKPLANE       TOGO_FLEX_5
  Link: source node = 1   BACKPLANE       TOGO_FLEX_1
  Link: source node = 1   BACKPLANE       TOGO_FLEX_3
------------------------------------------------------------------------
```

JET Update Configuration Menu

To update the configuration in a complex, 3 from the main JET menu as shown in Figure G-12.

Figure G-12 Interactive Mode Display

```
% jet -i

JET Interactive MAIN MENU!

  Select from the following options.
    1) Run JET.
    2) Display current configuration data.
    3) Update configuration.
    X) Exit

  Enter selection:
```

When selecting the Update Configuration Option, the menu shown in Figure G-13 is displayed, which shows a list of available complexes. Select the desired complex.

Figure G-13 Update Configuration Main Menu

```
JET Interactive COMPLEX SELECTION MENU!

  Select from the following options.

    1) feynman-s.
    X) Return to previous menu.

  Enter selection: 1
```

Figure G-14 Update Configuration Options Menu

```
JET Interactive Update menu.

  Select from the following options.

    1) Load new node configuration file.
    2) Add a Board to an existing node.
    3) Remove a Board from an existing node.
    4) Load flex mate file.
    5) Add a Link.
    6) Remove a Link.
    X) Return to previous menu.

  Enter selection: 2
```

Select the desired option. In this example Option 2, Add a Board to an existing node, is chosen and series of menus is presented to the user to add the board. These menus are presented in the following examples:

Example G-1 Selecting Node 0

```
JET Interactive NODE SELECTION MENU!


  Select from the following options.

    0) Node number 0.
    1) Node number 1.
    8) Node number 8.
    X) Return to previous menu.

  Enter selection: 0
```

Example G-2 Selecting A Processor Board

```
JET Interactive BOARD FAMILY SELECTION MENU!


  Select from the following options.

    2) BACKPLANE
    3) PROCESSOR
    5) IO
    X) Return to previous menu.

  Enter selection: 3
```

Example G-3 Selecting a PDH Riser Board

```
JET Interactive BOARD TYPE SELECTION MENU!


  Select from the following options.

    1) CELL
    2) PDH Card
    3) Slot 0 CPU
    4) Slot 1 CPU
    5) Slot 2 CPU
    6) Slot 3 CPU
    X) Return to previous menu.

  Enter selection: 1
```

Example G-4 Selecting the PDH Board

```
JET Interactive CELL BOARD NUMBER SELECTION MENU!


  Select from the following board numbers.

    0) Board number  0
    1) Board number  1
    2) Board number  2
    3) Board number  3
    4) Board number  4
    5) Board number  5
    6) Board number  6
    7) Board number  7
    X) Return to previous menu.

  Enter selection: 1
```

Example G-5 Selecting the PDH Board Name

```
JET Interactive BOARD NAME SELECTION MENU!


  Select from the following options.

    1) OCB
    2) OCB2
    3) OCB2-IPF
    4) OCB2-PA
    5) OCB2-2
    6) OCB2-2-IPF
    7) OCB2-2-PA
    X) Return to previous menu.

    Enter selection: 2
```

Example G-6 Selecting the Correct Device Numbers

```
JET Interactive DEVICE SELECTION for path number 0


JET Interactive DEVICE SELECTION for path number 1


  Select the correct device for: jab, Reference designator: U33

    1) jab    0x082b2291
    2) jab    0x182b2291
    3) jab    0x282b2291


  Enter selection: 3


  Select the correct device for: jab, Reference designator: U34

    1) jab    0x082b2291
    2) jab    0x182b2291
    3) jab    0x282b2291


 Enter selection: 3


  Select the correct device for: jab, Reference designator: U43

    1) jab    0x082b2291
    2) jab    0x182b2291
    3) jab    0x282b2291


  Enter selection: 3


  Select the correct device for: jab, Reference designator: U42

    1) jab    0x082b2291
    2) jab    0x182b2291
    3) jab    0x282b2291


  Enter selection: 3
JET Interactive DEVICE SELECTION for path number 2


  Select the correct device for: jab, Reference designator: U15

    1) jab    0x082b2291
    2) jab    0x182b2291
    3) jab    0x282b2291


  Enter selection: 3


  Select the correct device for: jab, Reference designator: U16

    1) jab    0x082b2291
    2) jab    0x182b2291
    3) jab    0x282b2291


  Enter selection: 3


  Select the correct device for: jab, Reference designator: U3
```

```
    1) jab    0x082b2291
    2) jab    0x182b2291
    3) jab    0x282b2291


  Enter selection: 3


  Select the correct device for: jab, Reference designator: U2

    1) jab    0x082b2291
    2) jab    0x182b2291
    3) jab    0x282b2291


  Enter selection: 3

JET Interactive Update menu.

  Select from the following options.

    1) Load new node configuration file.
    2) Add a Board to an existing node.
    3) Remove a Board from an existing node.
    4) Load flex mate file.
    5) Add a Link.
    6) Remove a Link.
    X) Return to previous menu.

  Enter selection: x

JET Interactive MAIN MENU!

  Select from the following options.

    1) Run JET.
    2) Display current configuration data.
    3) Update configuration.
    X) Exit

  Enter selection: x
```

JET Help Menu

To obtain help on available JET run parameters, enter the *-h* argument in the run line as shown in Figure G-15.

Figure G-15 JET Help Menu

```
% jet -h


usage: jet [-d <debug level>] [-f <complex> <node>] [-h] [-i] [-v]

Where:

    -d <debug level> = set debug level, valid values are 0 - 4.
    -f <complex name> <node number> = force a disconnect.
    -h = print this help page.
    -i = interactive mode.
    -o = Use old complex.cfg file format.
    -r = Perform Jtag resets on all paths prior to scanning.
    -s <complex name> = interrogate only the specified complex.
    -v = print JET version information.
```

Data Files

Input Data Files

JET uses several input data files of two main types: configuration files and architecture files. The configuration files control how the JET utility operates and the architecture files provide information on the system under test.

NOTE Comments can be used in any of these files and are indicated by a # sign in front of the comment.

Input Data File Locations

Unless otherwise specified, JET looks for its data using a search algorithm that is valid for all scan tools. It first looks for a local *./config* directory. If it is found, JET then looks for the required file in that location. If the file is not found, then JET checks to see if the *SCANSW_DIR* environment variable has been set. If this variable is set to the path specified in the variable, it will be used to find the file. Failing this, JET looks in the default scan file directory path for the file.

Configuration Files

Configuration files control the flow of execution and other processing information needed by the JET application. There are currently three configuration files: *jet.cfg*, *cplx.ini*, and *board_name.map*.

JET Configuration File (Optional)

This file contains several parameters that define JET operation. If the file is not found, then JET uses its default values. Each of the parameters described for this file may or may not be present. If they are not present, default parameters are used.

This file must be located in the directory from which JET is executed and must have the name *jet.cfg*.

The following list describes parameters supported in the JET configuration file:

- *Cplx_INI_File*—Shows JET where to look for the *cplx.ini* file (this file is described below). The default for this field is the */opt/scansw/data* directory. This field contains a path and file name.
- *Max_Msg_Retries*—Specifies JET how many times to resend a command before declaring a communications error. This field is a positive integer value with a default of five. It is used only with the UDP communications protocol.
- *Msg_Retry_Interval*—Specifies the amount of time to wait for a response to a command before timing out and resending the command. This is a positive floating point number with a default value of five seconds for UDP and 25 seconds for TCP.
- *Debug_Level*—Sets the debug level for JET. Based on this value, different amounts of data are logged into the *jet.log* file. The debug level is an integer value between zero and four.
- *Log_File*—Specifies the name of the JET log file. This field is a string specifying the path and file name of the file to use. The default is */opt/scansw/data/jet.log*.

- *Cplx_Cfg_File*—Allows the redirection of the complex configuration file created by JET. This field is a string specifying the path and file name to use for this file. The default for this parameter is */opt/scansw/data/complex.cfg*.

NOTE If any of the parameters listed above are present in the Jet Configuration File, they override the *SCANSW_DIR* environment variable and the default scan directory.

If this file is present it must end with the keyword *End_Of_File*.

Complex Initialization File

The *cplx.ini* file provides information on complex names, communications information, entity types, and protocols needed to communicate with the complex. Each complex that the SMS is responsible for should have an entry in this file.

The complex initialization, *cplx.ini*, file establishes a basis for communication between JET and the complex(es) being interrogated. JET uses this file when the JET Broadcast Enabled Flag is set to *FALSE*. This file contains a single line for each complex to be interrogated. JET looks for this file first by checking the *SCANSW_DIR* environment variable (if set). If this variable is not set, then JET looks for the file in the default */opt/scansw/data* directory. The file location and name can be modified by setting the *Cplx_INI_File* parameter in the *jet.cfg* file. This overrides all other locations.

File Format There are two types of entries in the *cplx.ini*. The type of entry is present for a complex depends on whether the complex has multiple host entities or only a single host entity. Multi-host entries are specified with the key *MH* while single host entities are specified with the key *SH*. Multi-host entities have an additional parameter for the hostname associated with each host entry. Single-host entities use the complex name as the hostname for the complex.

Each entry in this file begins with the keyword *COMPLEX* followed by the name and architecture code of the complex. These fields are followed by the multi- or single-host selection key: either *MH* or *SH*. Following this field comes the host entities type and reference number along with its supported SDP protocol version. The last series of fields represent the communication protocol, IP address, and port number to use for communications with this host. The type of each of these parameters follows:

complex name—string

architecture code—unsigned short

hostname—string

entity type—MP or NODE

entity reference num—integer

SDP version—string representation of a float

IP Address—IP address in dot notation

port number—unsigned short

Example G-7 Typical Usage

COMPLEX <complex name> <arch code> MH <hostname> <entity type> <entity ref num> <SDP version> <protocol> <IP address> <port num>

or

COMPLEX <complex name> <arch code> SH <entity type> <entity ref num> <SDP version> <protocol> <IP address> <port num>

Example G-8 Typical *cplx.ini* File

```
COMPLEX zurg-s     0x20  SH          MP  0  1.0  TCP  15.99.83.130  5151
COMPLEX feynman-s  0x30  MH  host_1  MP  0  1.0  UDP  19.99.83.101  5151
COMPLEX feynman-s  0x30  MH  host_2  MP  0  1.0  TCP  15.99.83.102  5151
```

Board Name Mapping File

The *board_name.map* file has two basic purposes. The first is to map board names to board part numbers. This mapping is required, because the part numbers in the EPROMs are changed to indicate repair history of the board. JET must be able to provide the JUST tool with part number matching its data files. The second is to support the JET interactive mode. This file contains scan handle values that map a board name with the type of board that name represents. When a user is adding a board of a specific type, JET looks though this file to find the name of all boards matching the specified type. It then displays a list of these board names for the user to select.

This file is located by the default path search with the subdirectory *arch_<arch_code>/cmd* appended to the base path, unless it exists in the *./config* directory.

Format

Comments Comments in the *board_name.map* file are specified by placing a # character at the beginning of the line containing the comment. End of line comments are not currently supported.

Version The first non-comment field in the *board_name.map* file must start with the keyword *FILE_VERSION* followed by the version number entered as a double.

FILE_VERSION <version number>

Board Entries Each board in the system has an entry in this file, which consists of the following information:

Board name—String representing the board name

Board part number—String representing the board part number to place in the node configuration file for this board

Scan Revision—Scan revision of the board

Board family—Board family scan handle value

Board type—Board type scan handle value

Example G-9 Board Entries With Comments

```
#########################################################################
#<board family> <board part num> <scan revision> <board family> <board type>
#########################################################################
```

HIOB A4856-60001 1 2 3

Architecture Files

Architecture files describe the system architecture, providing complex, node, board, and device information needed to properly interrogate the complex.

Complex Architecture File

This file describes the complex and contains information on the types of entities in the complex. Currently valid entity types are MPs and nodes. This file must have the name *complex.arc*.

Format

Comments Comments in this file are specified by placing a # character at the beginning of the line containing the comment. End of line comments are not currently supported.

Version Information The first non-comment field in the *cplx.ini* file must start with the keyword *FILE_VERSION* followed by the file version entered as a double.

MP List Entries The first type of entry in this file list the MPs that are possible within the complex. A MP list begins with the keyword *MP_List* and ends with the keyword *End_MP_List*. Between the begin and end tags are MP entries defined as follows.

MP Entries A MP entry begins with the keyword *MP_ID* and is followed by the MP reference number as an unsigned integer.

MP_ID <reference number>

Node List Entries The second type of entry in this file is a list of nodes. A node list begins with the keyword *Node_List* and ends with the keyword *End_Node_List*. Between the beginning and ending tags are the node entries as defined below.

Node Entries A node entry begins with the keyword *Node_ID* and is followed by the node type (either *PROCESSOR* or *IO_EXPANSION*), the nodes reference number, and a presence mask available boolean. If the mask available flag is *TRUE* then the next field is the bit in the mask representing this node, if the flag is *FALSE* then this field is omitted. The mask available field(s) are followed by the is host flag which indicates whether this entity is a host or not. If the host flag is *FALSE* then the entity to which commands destine for node are to be sent is specified along with its reference number.

Node_ID <node type> <ref num> <mask flag> [<mask bit>] <host flag> [<entity type> <entity ref #>]

End of file marker As with all scan files this file must end with the keyword *End_Of_File*.

Example G-10 Complex Architecture File

```
FILE_VERSION 4.0

       MP_List
               MP_ID 0
       End_MP_List
       Node_List
                Node_ID PROCESSOR 0 TRUE 0 FALSE MP 0
                Node_ID IO_EXPANSION 8 FALSE TRUE
       End_Node_List
End_Of_File
```

Node Architecture File

This file describes a node and contains the types of boards in each node type and a description of the scan paths in the node. This file contains a list of boards that make up the node followed by a list of paths. The path entries map the paths though the boards to the path in the node.

This file can currently have one of two names: *node_PROCESSOR.arc* or *node_IO_EXPANSION.arc*.

Format

Comments Comments are specified by placing a # character at the beginning of the line containing the comment. End of line comments are not currently supported.

Version Information The first none comment field must start with the keyword *FILE_VERSION* followed by the file version entered as a double.

FILE_VERSION <version number>

Board Lists The board list section begins with the keyword Board_List and ends with the keyword *End_Board_List*. Between these tags are board entries for each of the boards in the node.

Board entries begin with the keyword Board followed by the board family, board type, and the board reference number. Board entries end with the keyword *End_Board*. Board entries contain a variable number of parameters each designated by a keyword. Each of the parameters that can be specified has default values that are used if the parameter is not present. Below is a list of the board options.

- *required*—By default boards are consider to be not required. If a board is required, it must have an entry beginning with the keyword *required* followed by an upper case boolean either *TRUE* or *FALSE*.
- *eprom*—By default boards are assumed to have serial EPROMs from which the board name and scan revision can be retrieved. If a board doesn't have an eprom then the board name, part number and scan revision must be supplied. An eprom entry begins with the keyword *EPROM* and is followed by a boolean indicating whether eprom data is available. If EPROM data is not available (*FALSE*) then the entry must specify the board name, part number, and scan revision as follows:

  eprom <TRUE/FALSE> [<board name> <part number> <scan revision>]
- *num_scan_paths*—By default a board is assumed to have no (zero) scan paths. If a board has scan paths, the number of paths on the board must be defined, using the keyword *num_scan_paths* followed by an unsigned integer representing the number of scan paths on the board as follows:

  num_scan_paths <# scan paths>

Masks By default a board is assumed to not have a presence mask. If a presence mask does exist for this board then an entry defining the mask is required. A mask entry begins with the keyword *mask* followed by a boolean indicating whether a mask is available. If a mask is available then the following data is also required. The bit in the mask that reflects this board, the type of mask to request (either CELL_MASK, IO_MASK, or NODE_MASK), the type of entity the mask should be sent to an that entities reference number.

mask <TRUE/FALSE> [<bit in mask> <mask type> <destination entity> <destination entity number>

Dependency A dependency is a relationship between boards. There are two currently supported dependency types: CHILD and PARENT. A board that contains a child dependency depends on the board specified in the dependency to be present. A board that contains a parent dependency must be present for the board specified in the dependency to be present. During normal JET operations these dependencies are used to resolve presence issues. In interactive mode these dependencies are used to prevent invalid configurations from being created.

By default, boards are considered to contain no dependencies. If a board has a dependency then an entry must be made. A dependency entry begins with the keyword *dependency* followed by the family, type and reference number of the board and the dependency type.

dependency <board family> <board type> <board number> <dependency type>

Example G-11 Board list

```
Board_List
            Board  2  1  0
              required  FALSE
              eprom TRUE
              num_scan_paths  3
              mask  TRUE  3  IO_MASK  MP  0
              dependency  5  3  1  PARENT
      End_Board
      Board  5  1  5
             required  TRUE
             eprom  FALSE  HMIOB  A5201-60005  1
             num_scan_paths  1
```

```
            mask  FALSE
            dependency 2  1  0  CHILD
        End_Board
    End_Board_List
```

The Path List The next section of Node Architecture FIle defines the scan paths in the node. Each of the nodes scan paths are composed of one or more scan paths on the board defined in the board list. The path list begins with the keyword *Path_List* and ends with the keyword *End_Path_List*. Between these tags are the individual path definitions for the node.

Path Entries A path entry defines the boards and there scan paths that make up this node level scan path. A path entry begins with the keyword *Path* followed by the paths reference number. A path entry ends with the keyword *End_Path*. Between these tags are board entries for each board composing the path.

Board Entries A board entry in a path begins with the keyword *board* followed by the family, type, and reference number of the board and the path on the board that is to be used. These entries must be in order of how they appear on the path through the node as follows:

board <board family> <board type> <board reference num> <board path num>

Example G-12 Path Entry

```
    Path_List
        Path 1
            board  2  1  0  2
            board  3  2  6  0
        End_Path
        Path 2
            board  5  1  1  1
            board  3  2  6  2
        End_Path
    End_Path_List
```

End of File Marker This file must end with the keyword *End_Of_File*.

Board Architecture File

The Board Archiritecture File describes the scan paths and link connections present on the board. It lists the devices present on each board scan path along with there name, and removal information. It also has a section that lists the connections present on the board for links.

A board architecture file must exist for each board part number/scan revision. Its file name has the form *brd_<board part number>_<scan revision>.arc*. This file is named using the prefix *brd_* followed by the board name and scan revision separated by an underscore and ending with the suffix *.arc*.

Format

Comments Comments in this file are specified by placing a # character at the beginning of the line containing the comment. End of line comments are not currently supported.

Version Information The first none comment field in the cplx.ini file must start with the keyword *FILE_VERSION* followed by the files version entered as a double.

Example G-13 Board Architecture File Version

FILE_VERSION <version number>

Board Path Entries The first series of entries in this file describe the scan paths on the board and the devices on those paths. Each of these entries begins with the keyword Board_Path followed by the path number. The entries end with the keyword End_Board_Path. Between the beginning and ending tags the devices on the path are defined. A device entry begins with the keyword Device and is followed by the devices reference number, the device name, the devices reference designator, a boolean indicating whether the device is required, and finally the devices removal order.

- Device number—integer
- Device name—string
- Reference designator—string
- Required flag—TRUE | FALSE
- Removal order—integer

NOTE The removal order determines which non-required devices are missing if less than the maximum number of devices are encountered. The lower the removal order the more likely the device is missing.

Link Connection Entries Each link connection to this board needs to have an entry in this file. Link entries contain primary and secondary link connection information. A link entry is specified as follows.

Each entry begins with the keyword *`Link_Type`* followed by the link type number and ends with the keyword, *`End_Link_Type`*. Between the begin and end are entries for Primary and Secondary link connections. A primary link connection is the originating connection. The secondary entries are destinations for the link.

A primary link connection begins with the keyword *`Primary`* and ends with the keyword *`End_Primary`*. Between the begin and end tags the possible connections are listed as specified below:

- ID—Cable number of device selector number
- lookup—Number added to look up the correct entry
- loopback—Flag that indicates whether the connection is a loopback connection
- type—String that indicates the type of cable being processed
- part number—Part number of the cable as a string
- name—String representing the name of the link cable

Secondary link connections begin with the keyword *`Secondary`* and end with the keyword *`End_Secondary`*. Connections on a secondary link follow the same format as those of a primary link but use two less fields.

Link connections begin with the keyword *`Connection`* followed by the following fields.

- ID—Cable number of device selector number
- lookup—Number added to look up the correct entry
- loopback—Flag that indicates whether the connection is a loopback connection
- type—String that indicates the type of cable being processed

End of File This file must end with the keyword *`End_Of_File`*.

Example G-14 Board Architecture File

```
FILE_VERSION 4.0

################################################################################
# Board_Path  <path number>
################################################################################
Board_Path1

##########################################################################
# Device  <ref num>  <device name>  <ref des>  <required>  <removal order>
##########################################################################
Device6elroyU5007TRUE0
Device8dnaU5000FALSE1

End_Board_Path

##########################################################################
# Link_Type <link type>
##########################################################################
Link_Type1

Secondary

##########################################################################
# Connection <ID> <lookup> <loopback>  <type> <brd ref des> <cable ref des>
##########################################################################
Connection10FALSEIOFC0014P1
Connection11TRUEIOFC0415N1

End_Secondary

Primary

##########################################################################
# Connection <ID> <lookup> <loopback> <type> <brd ref des> <cable ref des>
#<PN> <name>
##########################################################################
Connection1  0  FALSE  IO  J5005T  P1  A5201-63037_0001  CELL0_REO_IN
Connection1  1  TRUE    IO  J5033T  P1  A5201-63037_0001  CELL1_REO_IN

End_Primary

End_Link_Type

End_Of_File
```

Device Architecture File

The device architecture file lists valid JTAG IDs for a device based on the device name. If a device does not have a JTAG ID, then a default ID entry must be included in this file. The file must exist for each device name present in the board architecture file. Its file name has the form *dev_<device name>.arc*. and is named by placing the prefix *dev_* in front of the device name and ending it with the suffix *.arc*.

Format

Comments Comments in this file are specified by placing a # character at the beginning of the line containing the comment. End of line comments are not currently supported.

Version Infromation The first none comment field in the cplx.ini file must start with the keyword *FILE_VERSION* followed by the files version entered as a double.

Example G-15 Device Architecture File Version

```
FILE_VERSION <version number>
```

Device Entries Each valid JTAG ID for this device must have an entry in this file. Entries consist of the keyword *Device_Id* followed by the device name and the unsigned long representation of the JTAG ID.

Example G-16 Device ID

```
###################################################################
# Device_Id  <device name>  <jtag id>
###################################################################
  Device_Id  dna1  0x14076049
```

If a device does not have a JTAG ID, a default ID must be provided in this file. The format of a default entry begins with the keyword *Default_Id* followed by the device name and the default JTAG ID represented as a string.

The default JTAG ID string must begin with the *0x*. The JUST tool looks for this these characters and strips them off to build its device file names.

Example G-17 Default ID

```
###################################################################
# Device_Id  <device name>  <jtag id>
###################################################################
  Device_Id  dna1  0x14076049
```

End of File Marker This file must end with the keyword *End_Of_File*.

Link Architecture File

The link architecture file describes the possible link interconnects possible within a complex. These connections are any that are not static within a system.

There is only one link architecture file for each complex and it must be named *link.arc*.

Output Data Files

JET produces both data files and log files. Other scan tools use the data files created by JET as input information. The log file generated by JET contains information on its execution. JET output files are described in the following sections.

Complex Configuration File

This file contains information on the systems available for test on a particular network. It is used by the *Libsdp* library to direct messages from the test station to the system under test.

There is only one complex configuration file, which must be named *complex.cfg*. It may contain entries for multiple complexes. JET places this file in the default scan directory */opt/scansw/data*.

System entities represent MPs and nodes. The data contained in this file provides information on what entities can be tested and the basics of how to communicate with each of the entities specified. This file is normally created by JET. Below is a description of each entry in the file.

Comments Comments in this file are specified by placing a # character at the beginning of the line containing the comment. End of line comments are not currently supported.

Complex Entries Each complex entry in the file begins with the keyword *Complex* followed by the complex name string and the complex's architecture code. A complex entry ends with the keyword *End_Complex*. Both of these entries must be on separate own lines.

Example G-18 Complex Entries

```
Complex  <complex name> <architecture code>
   .
   .
   .

End_Complex
```

Between these tags are the entity instances described below.

Entity Entries Entities exist within the complex tags. There are currently of two types: MP or NODE. Each entity begins with the keyword *Entity*, followed by the entity type and its reference number, and ends with the keyword *End_Entity*. Each of these tags must be on a separate line as shown below:

```
Entity  <MP|NODE> <reference number>
   .
   .
   .

End_Entity
```

The fields between the entity tags are described in the following section.

Entity Parameters Each Entity in this file must contain one and only one of the following entries.

If the entity is a Host—meaning that it has an Ethernet presence with its own IP address— then the entity requires a hostname entry in the file. A hostname entry begins with the keyword *Hostname* and is followed by the hostname string, the communication protocol (UDP or TCP), its IP address in dot notation, and the communications port number.

```
Hostname   <host name>   <TCP|UDP>   <ip address>   <port number>
```

If an entity is not a host, then a reference to the target host entity must be supplied. This reference specifies which host entity commands targeted to this entity must be directed. This targeting entry begins with the keyword *Target_Entity* followed by the entity type (*MP|NODE*) and its reference number:

```
Target_Entity<target entity type><target entity ref number>
```

Firmware information entries:

Firmware Information Entries Each entity must have a firmware information entry. This entry defines the capabilities of the firmware to processes Scan Requests. A firmware entry begins with the keyword *Firmware* followed by the supported sequence queue depth and queue size in kilobytes, and the version of the SDP protocol supported.

```
Firmware    <queue depth>    <queue size kBytes>    <SDP version>
```

End of File The complex configuration file must always end with the keyword *End_Of_File*.

Example File The following is an example of the Complex Configuration File:

```
#######################################################
# complex name architecture code
#######################################################
Complex zurg- s0x20
##########################################################
# entity type entity reference number
##########################################################
Entity MP0
####################################################
# host name protocol address port
####################################################
Hostname zurg -s UDP 15.99.83.130 5151
####################################################
#queue depth queue size SDP version
####################################################
Firmware 165536 1.0
End_Entity
##########################################################
# entity type entity reference number
##########################################################
Entity NODE 0
####################################################
# entity type entity reference number
####################################################
Target_Entity MP 0
####################################################
#queue depthqueue  size SDP version
####################################################
Firmware 16553 6 1.0
End_Entity
End_Complex
End_Of_File
```

Node Configuration Files

Each node detected by JET gets a node configuration file. These files are named *node_<node number>.cfg* and are placed in the default scan directory */opt/scansw/data/cplx_<hostname>*. Where hostname is the name of the complex under test. Theses files define the boards and paths present in each node. This file is created by the Configuration Management Deamon (*cmd*).

An entry like the following must be supplied for each board in the node:

```
Board   <scan handle>  <board name>  <board part number>_<scan revision>
```

An entry like the following must be supplied for each path in the node:

```
Path    <path number>
```

Each device on the path must have an entry like the following:

```
Device   <scan handle> <mechanical name>  <device reference designator>  <jtag identifier>
<device name>
```

The *mechanical name* field in the device descriptor line identifies a unique name for the device. This unique name is used by DSU to delineate between common devices on a scan path and is identified in the *partname.lst* file.

Flex Link Mating File

The flex link mating file contains information on the non-static connections within the system, needed to determine how the current system is connected. There is only one flex link file for a complex, and it must be named *flex.mte.* JET places this file in the default scan directory */opt/scansw/data/cplx_<hostname>*.

The flex.mate file specifies all flex and cable connections for a complex. This file only contains information on all possible links that could exist in the complex base on the hardware present. Links that don't exist because hardware is not present are not listed. This file is generated by the Configuration Management Deamon (*cmd*).

An entry like the following must be present for each existing or possible link in the complex:

Link <cable scan handle> <cable part number> <cable name>

An entry like the following must exist for each connector on the link:

Mate <cable type> <board scan handle> <connector ref des> <cable ref des>

Mate <cable type> <board scan handle> <connector ref des> <cable ref des>

JET Log File

JET writes its execution information (errors and general informational) into a log file. The level of information is controlled by the debug level parameter in the *jet.cfg* file. This file is the first level for understanding problems encountered during JET execution. The name and location of this file are controlled by the *Log_File* parameter in the *jet.cfg* file.

Error Conditions

When errors are detected during update, several things can happen.

If the error is detected at the complex level, an error is written to the *complex.cfg* file, but the complex data will not be present in the file.

If an error is detected at the node level, the node configuration file will contain an error message and no data will be present.

If an error is detected at the board level, an error message is placed in the node configuration file for the board. This message prevents JUST from loading the file but does not affect any other board or path data in the file.

If an error is detected at the scan path level, the path entry in the file will contain an error message that prevents JUST from loading the file, but no other path data is affected.

In any of these cases, a *jet.err* file is created and an entry for the node is added to it. If an error occurs at the node level, the nodes entry is not placed in the *complex.cfg* file.

If an error is detected during link processing, a message is placed in the *flex.mte* file for certain error types. Due to the fact that the *flex.mte* file is complex wide, JET may encounter errors when testing a single node with other nodes in the complex powered off. This is a valid test condition. Therefore, link errors due to destination nodes not being present are dropped and a *jet. log* entry is made, but no error is entered into the flex.mte file.

H Templates

This appendix contains blank floor plan grids and equipment templates. Combine the necessary number of floor plan grid sheets to create a scaled version of the computer room floor plan.

Figure H-1 illustrates the locations required for the cable cutouts.

Figure H-2 on page 301 illustrates the overall dimensions required for a SD32 system.

Figure H-3 on page 302 illustrates the overall dimensions required for a Superdome 64 Way system.

Figure H-1 Cable Cutouts and Caster Locations

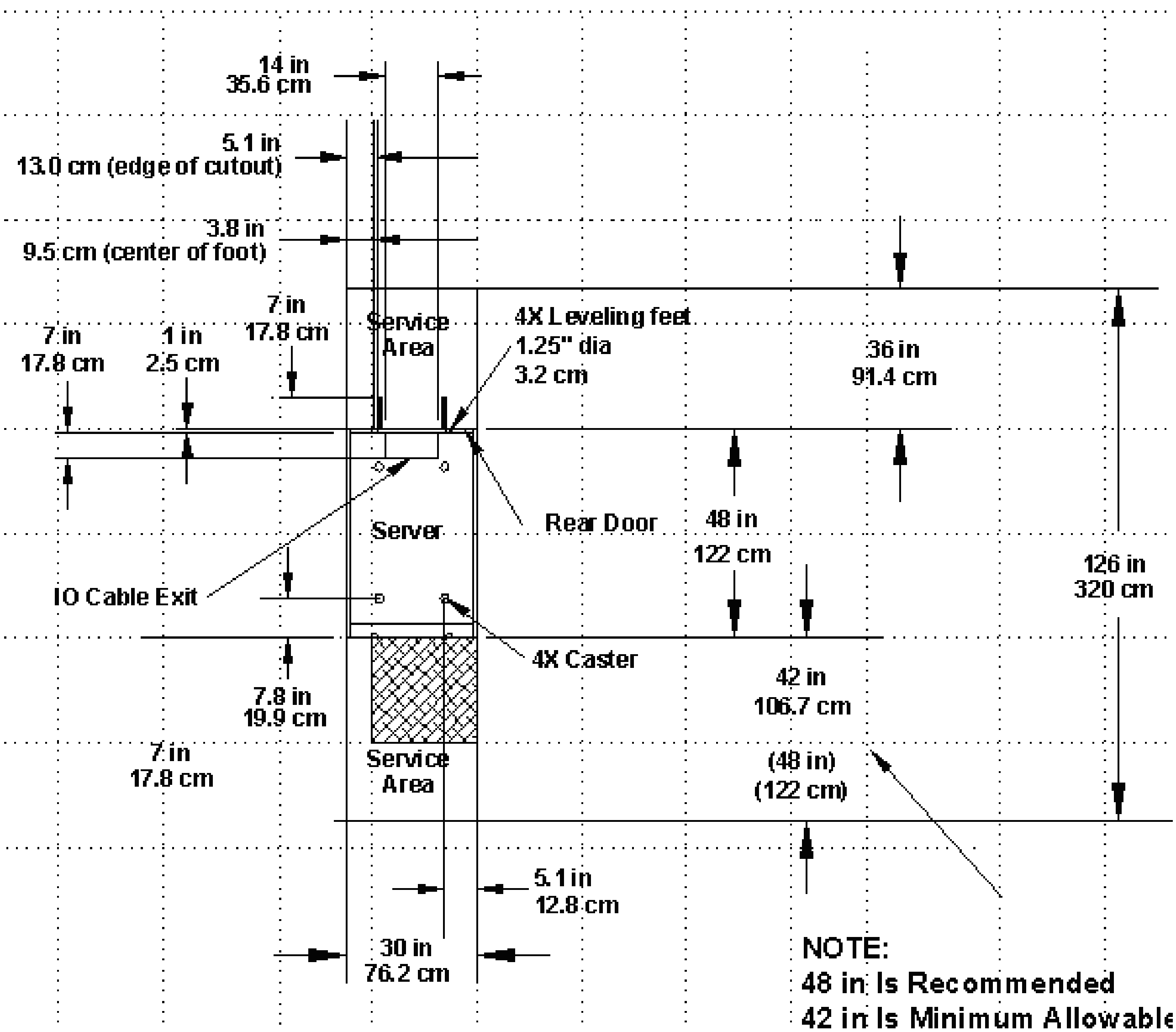


Figure H-2 **hp Integrity Superdome or hp 9000 Superdome SD16 and SD32 Space Requirements**

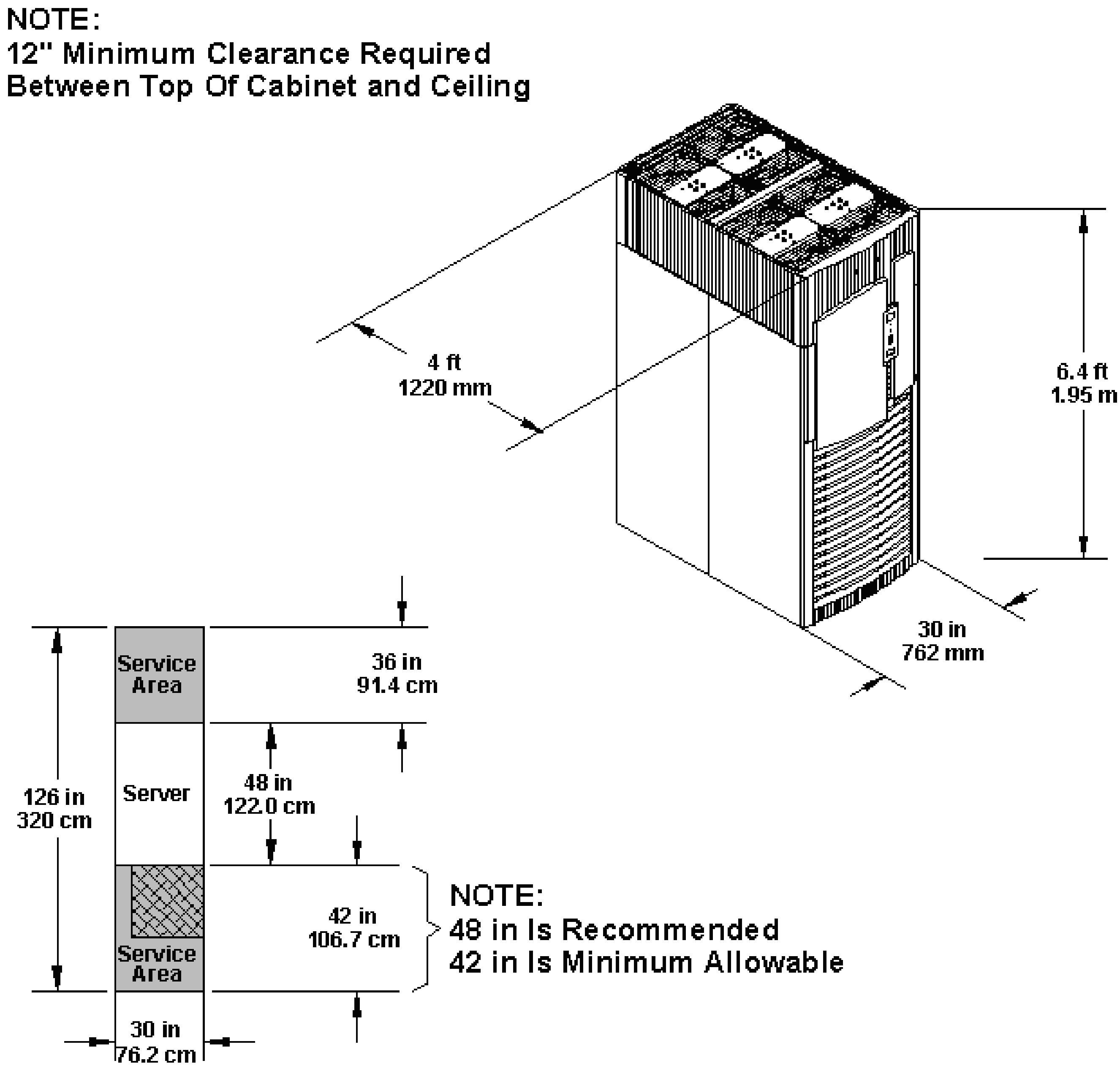
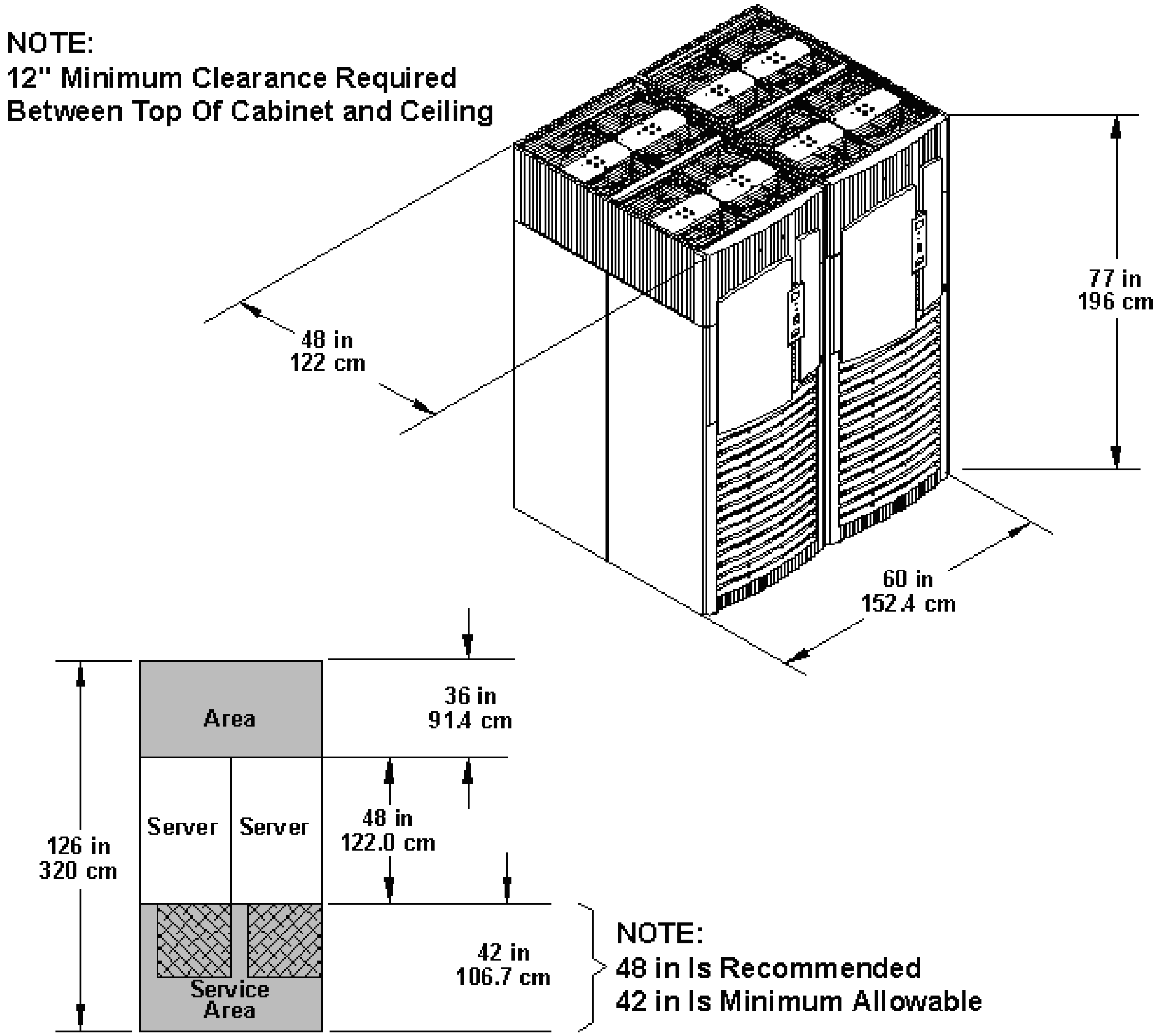


Figure H-3 hp Integrity Superdome or hp 9000 Superdome SD64 Space Requirements



Equipment Footprint Templates

Equipment footprint templates are drawn to the same scale as the floor plan grid (1/4 inch = 1 foot). These templates are provided to show basic equipment dimensions and space requirements for servicing.

The service areas shown on the template drawings are lightly shaded.

The equipment templates should be used with the floor plan grid to define the location of the equipment that will be installed in your computer room.

NOTE Photocopying typically changes the scale of copied drawings. If any templates are copied, then all templates and floor plan grids must also be copied.

Computer Room Layout Plan

Use the following procedure to create a computer room layout plan:

Step 1. Remove several copies of the floor plan grid.

Step 2. Cut and join them together (as necessary) to create a scale model floor plan of your computer room.

Step 3. Remove a copy of each applicable equipment footprint template.

Step 4. Cut out each template selected in Step 3; then place it on the floor plan grid created in Step 2.

Step 5. Position pieces until the desired layout is obtained; then fasten the pieces to the grid. Mark locations of computer room doors, air-conditioning floor vents, utility outlets, and so on.

Figure H-4 hp Integrity Superdome or hp 9000 Superdome SD32 and SD64, and I/O Expansion Cabinet Templates

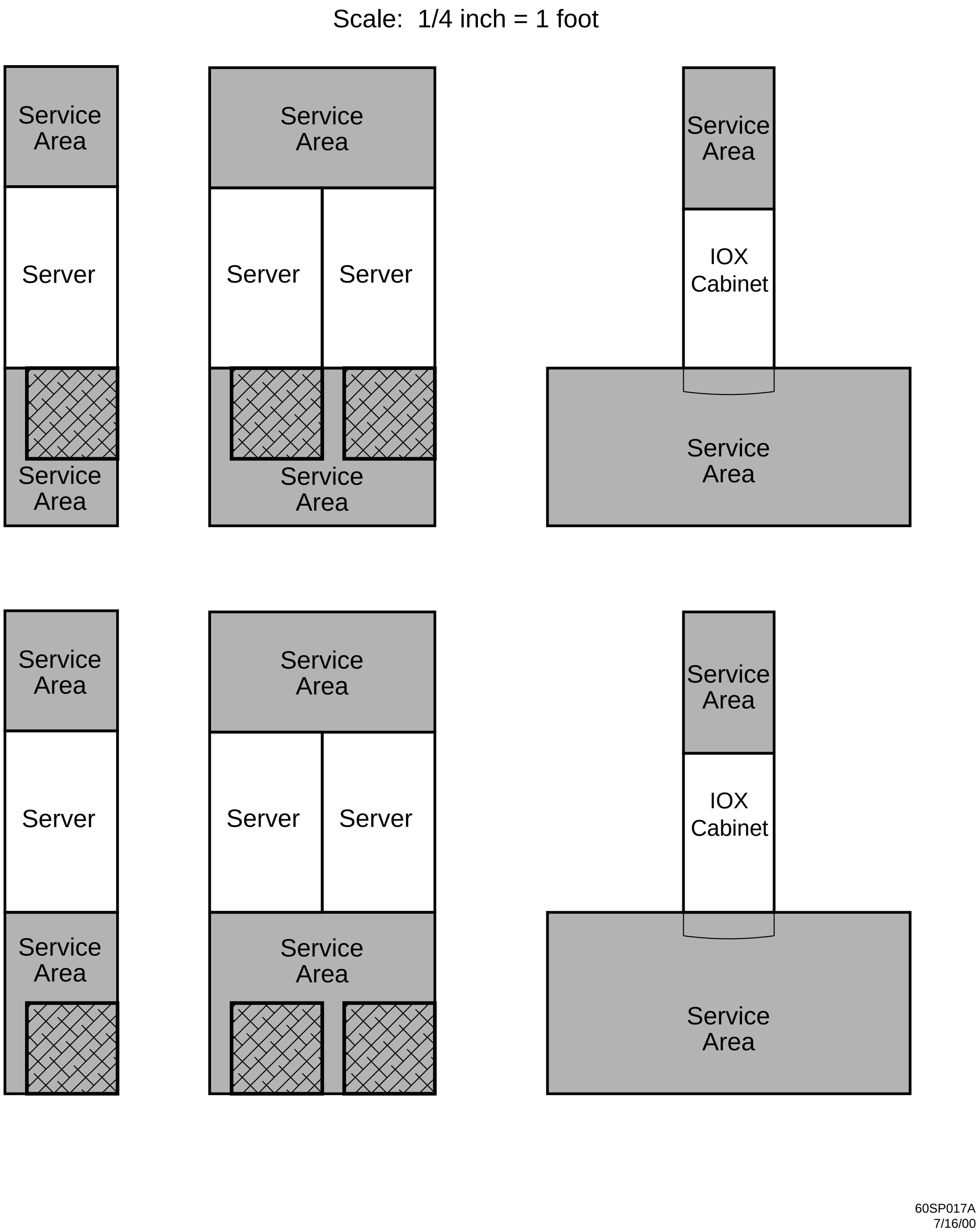


Figure H-5 hp Integrity Superdome or hp 9000 Superdome SD32 and SD64, and I/O Expansion Cabinet Templates

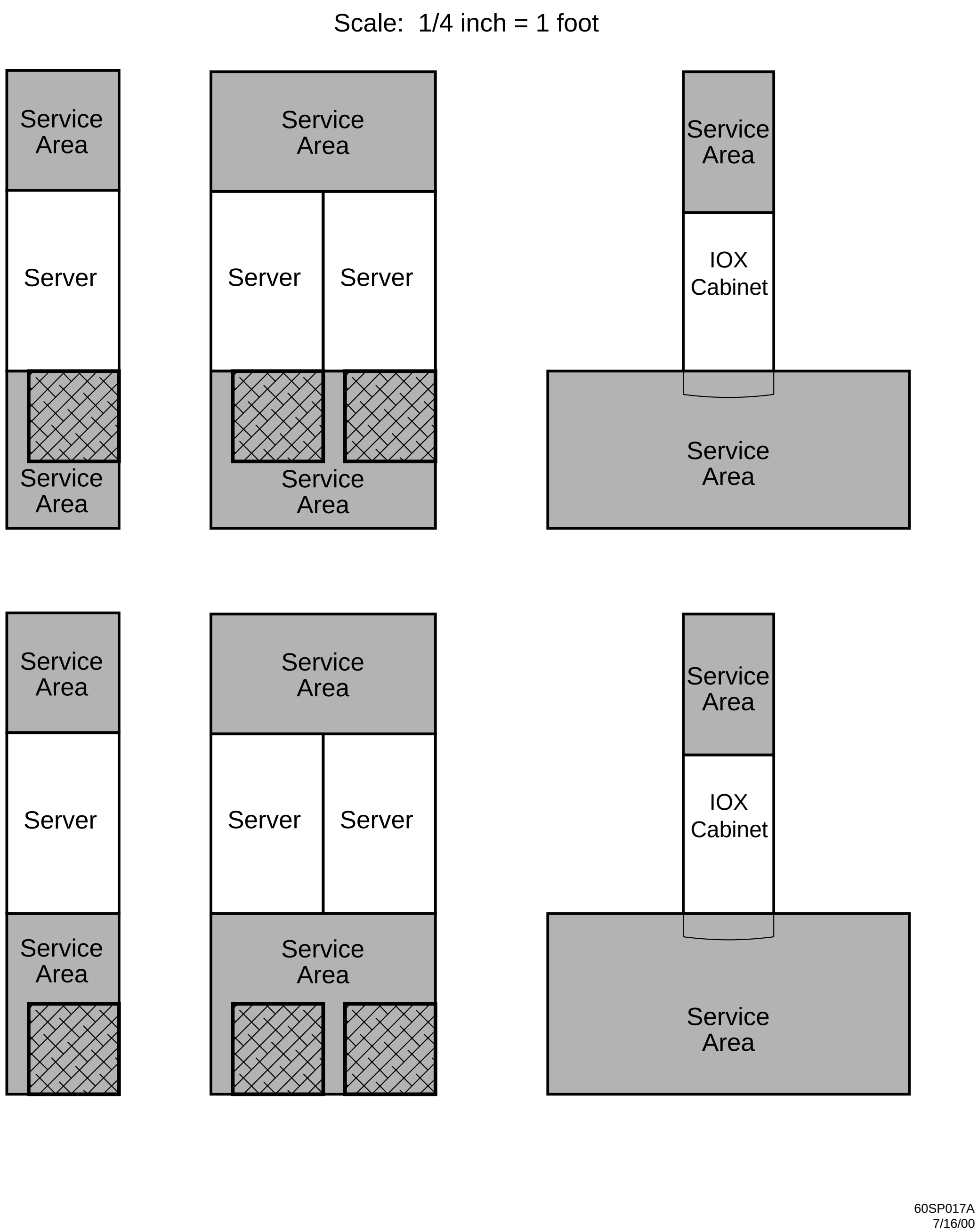


Figure H-6 hp Integrity Superdome or hp 9000 Superdome SD32 and SD64, and I/O Expansion Cabinet Templates

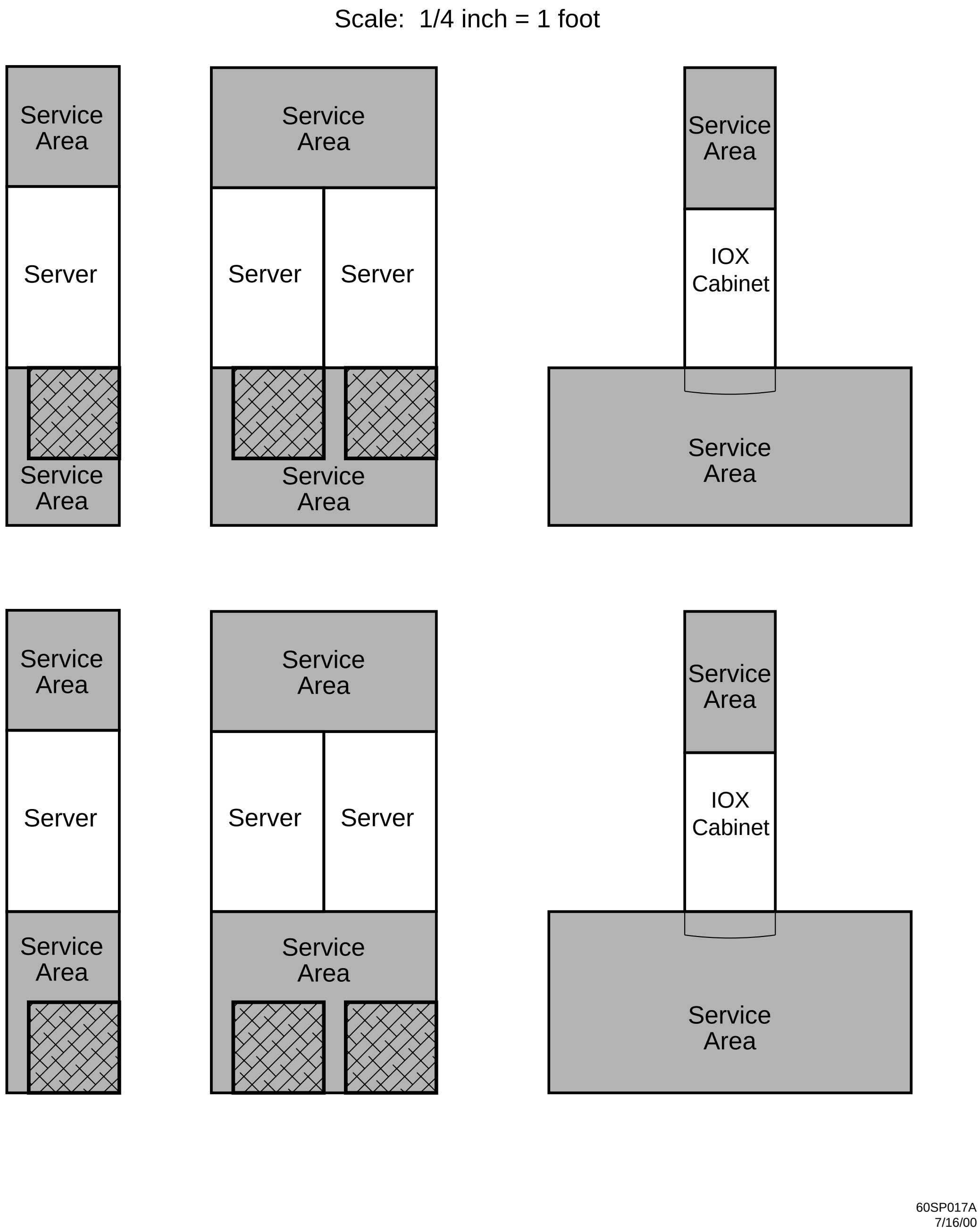


Figure H-7 hp Integrity Superdome or hp 9000 Superdome SD32 and SD64, and I/O Expansion Cabinet Templates

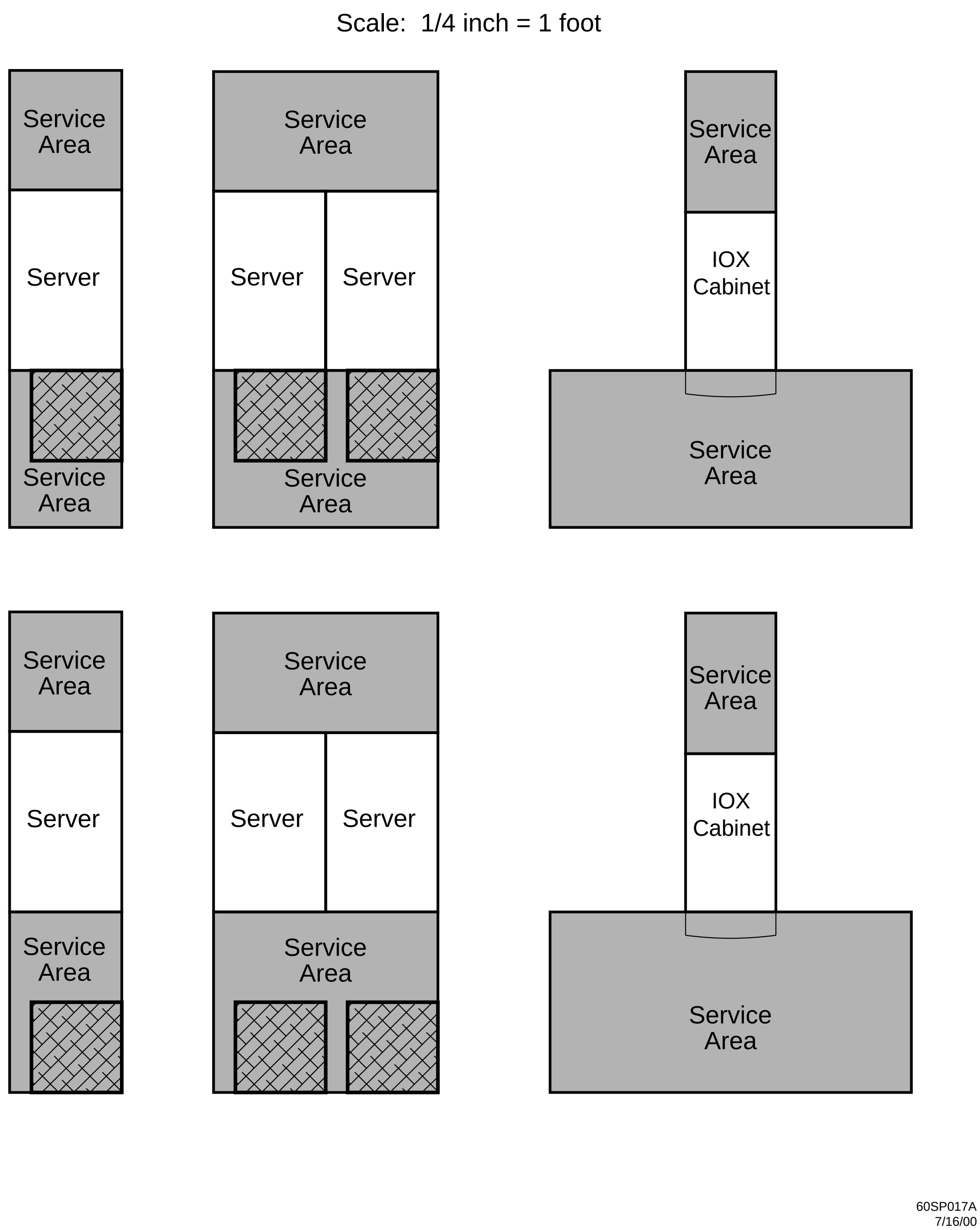


Figure H-8 hp Integrity Superdome or hp 9000 Superdome SD32 and SD64, and I/O Expansion Cabinet Templates

Scale: 1/4 inch = 1 foot

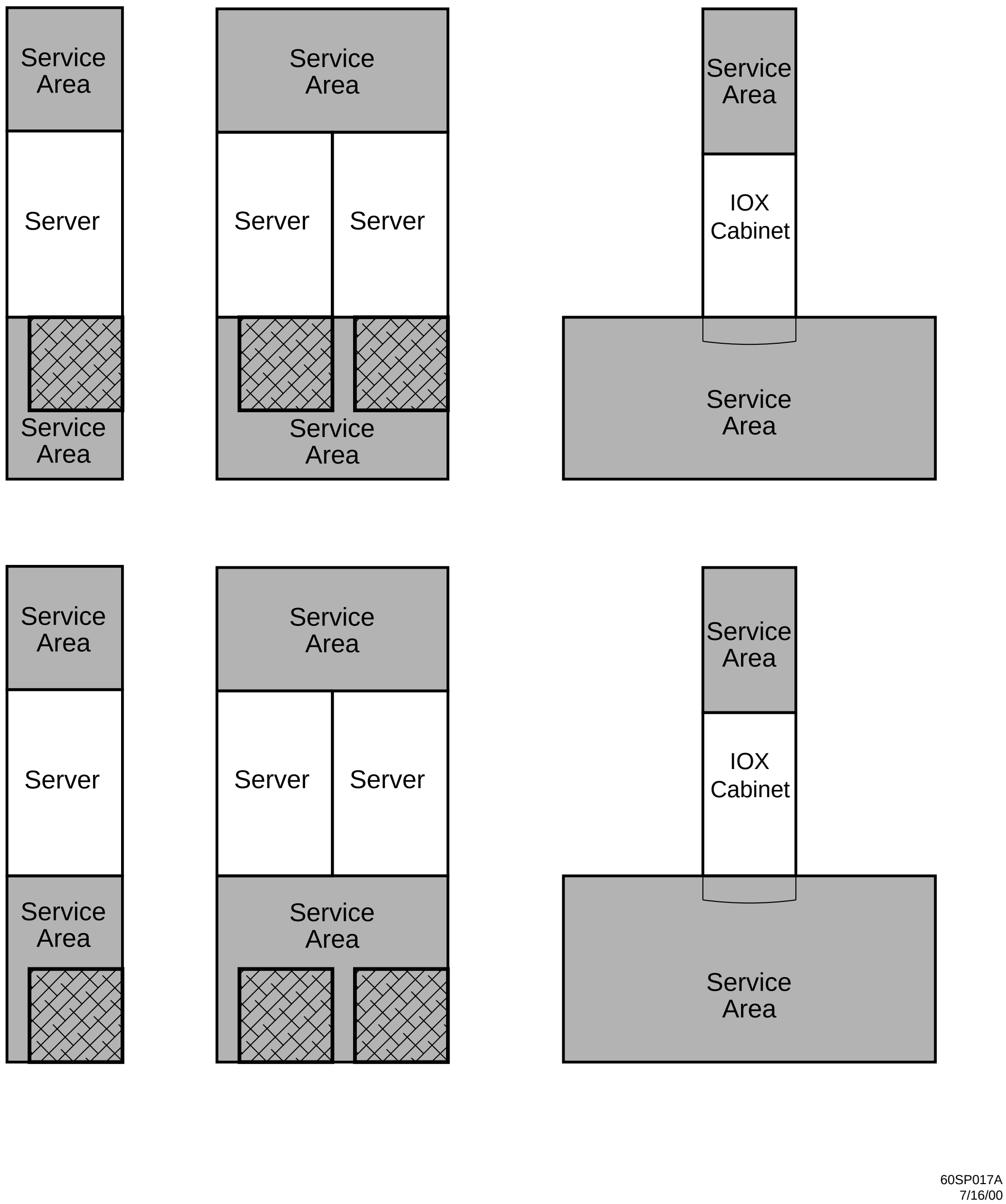


Figure H-9 hp Integrity Superdome or hp 9000 Superdome SD32 and SD64, and I/O Expansion Cabinet Templates

Scale: 1/4 inch = 1 foot

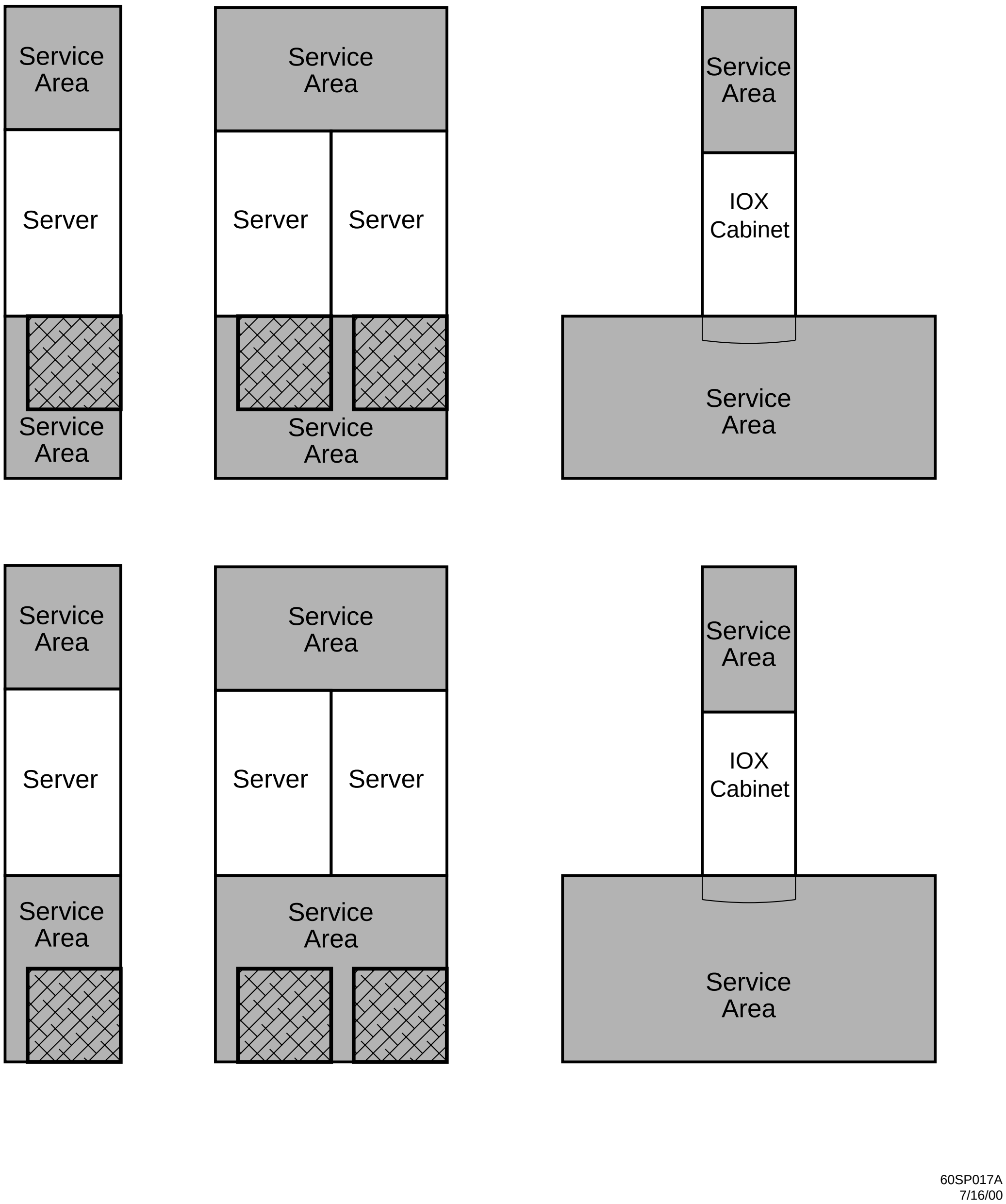
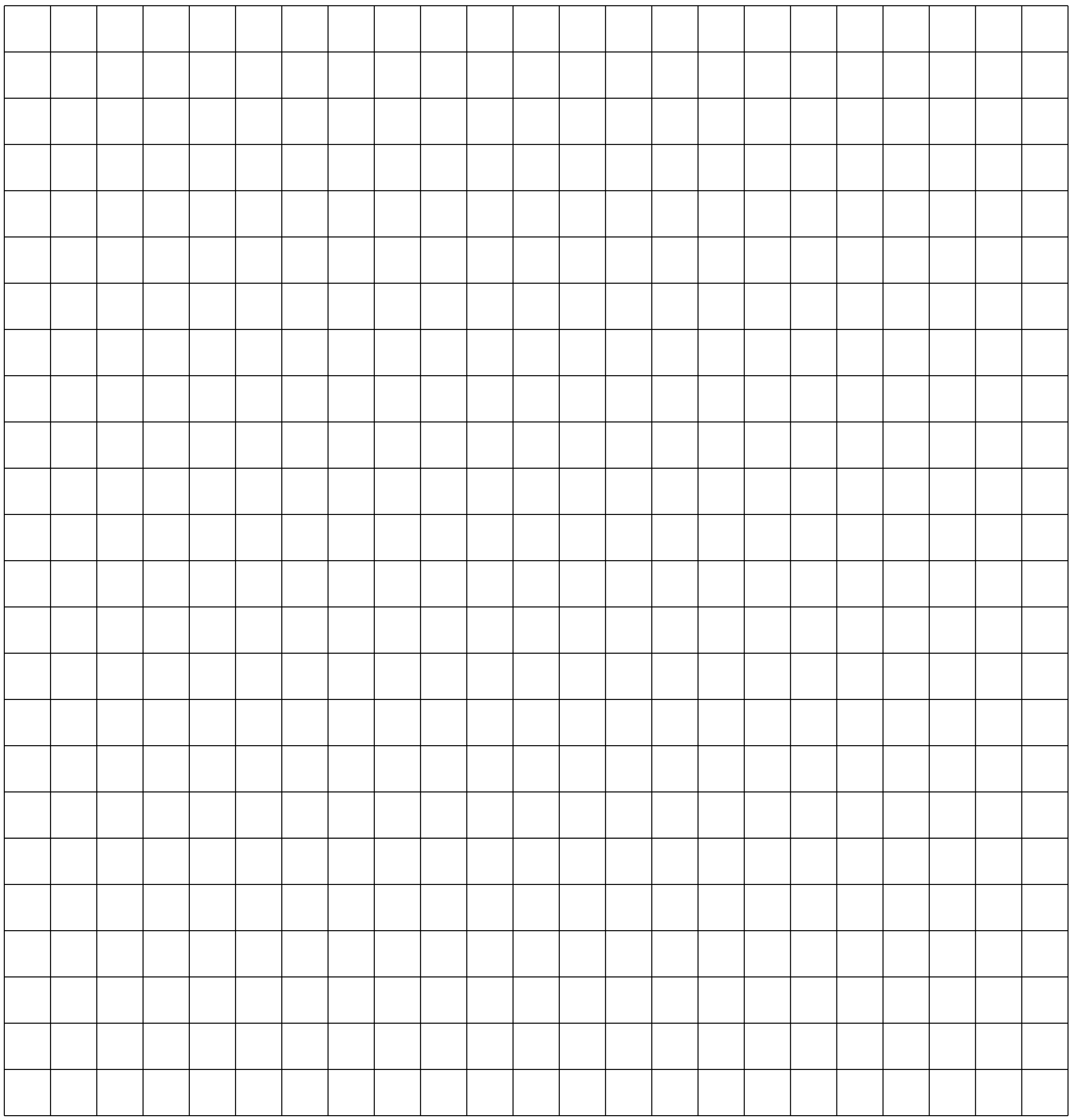


Figure H-10 Computer Floor Template

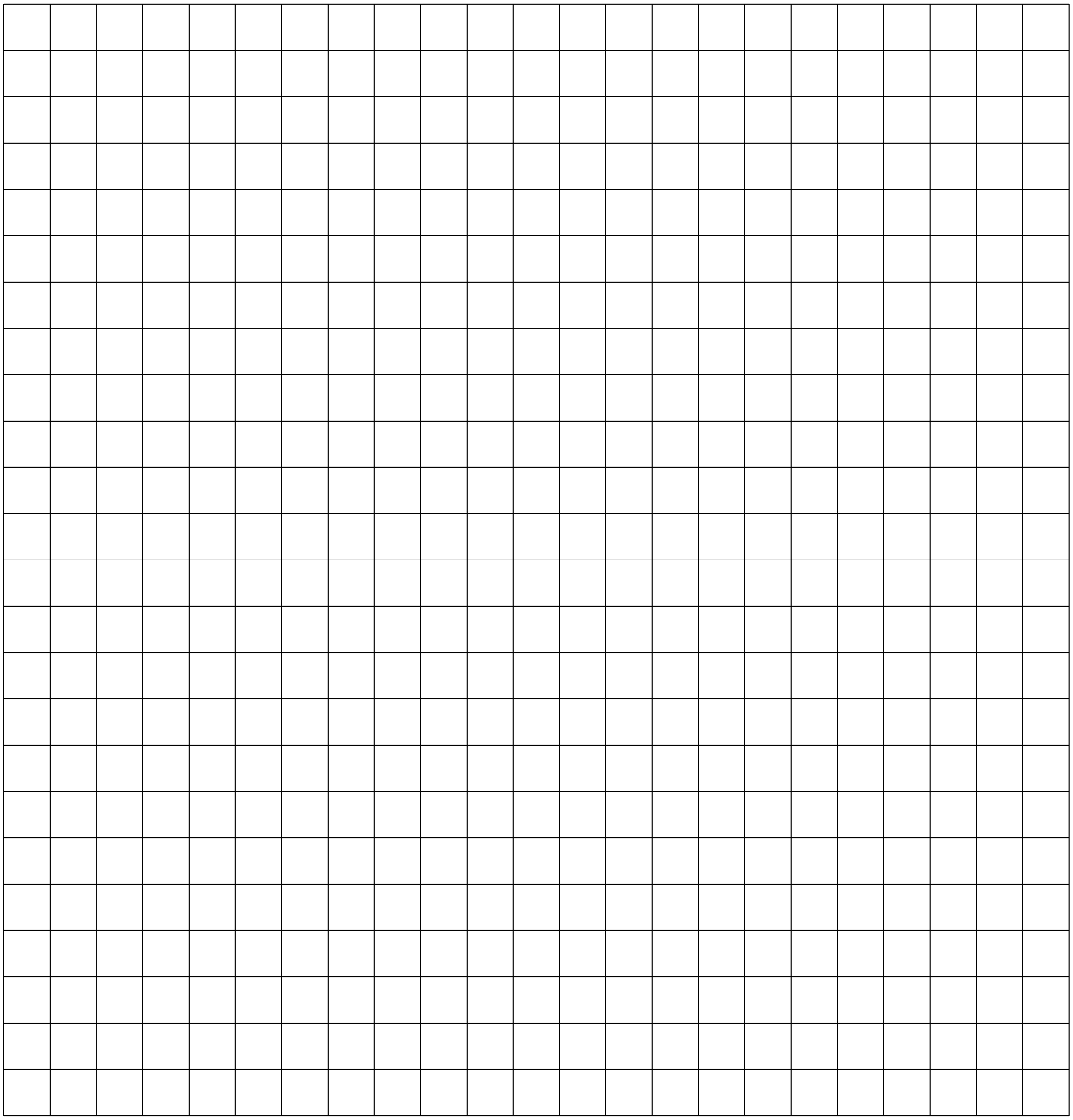
Scale: 1/4 inch = 1 foot



60SP016A
12/20/99

Figure H-11 Computer Floor Template

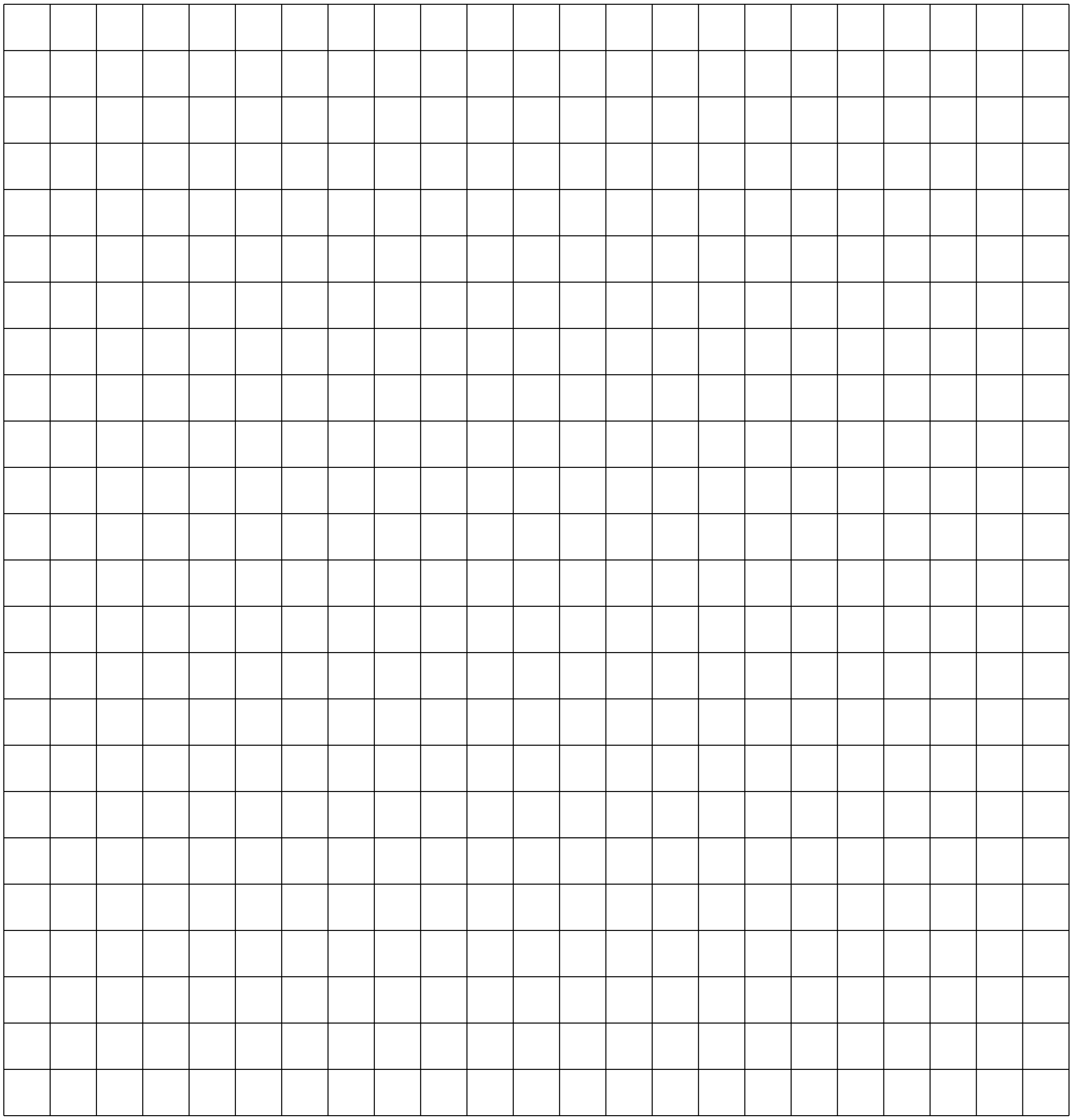
Scale: 1/4 inch = 1 foot



60SP016A
12/20/99

Figure H-12 Computer Floor Template

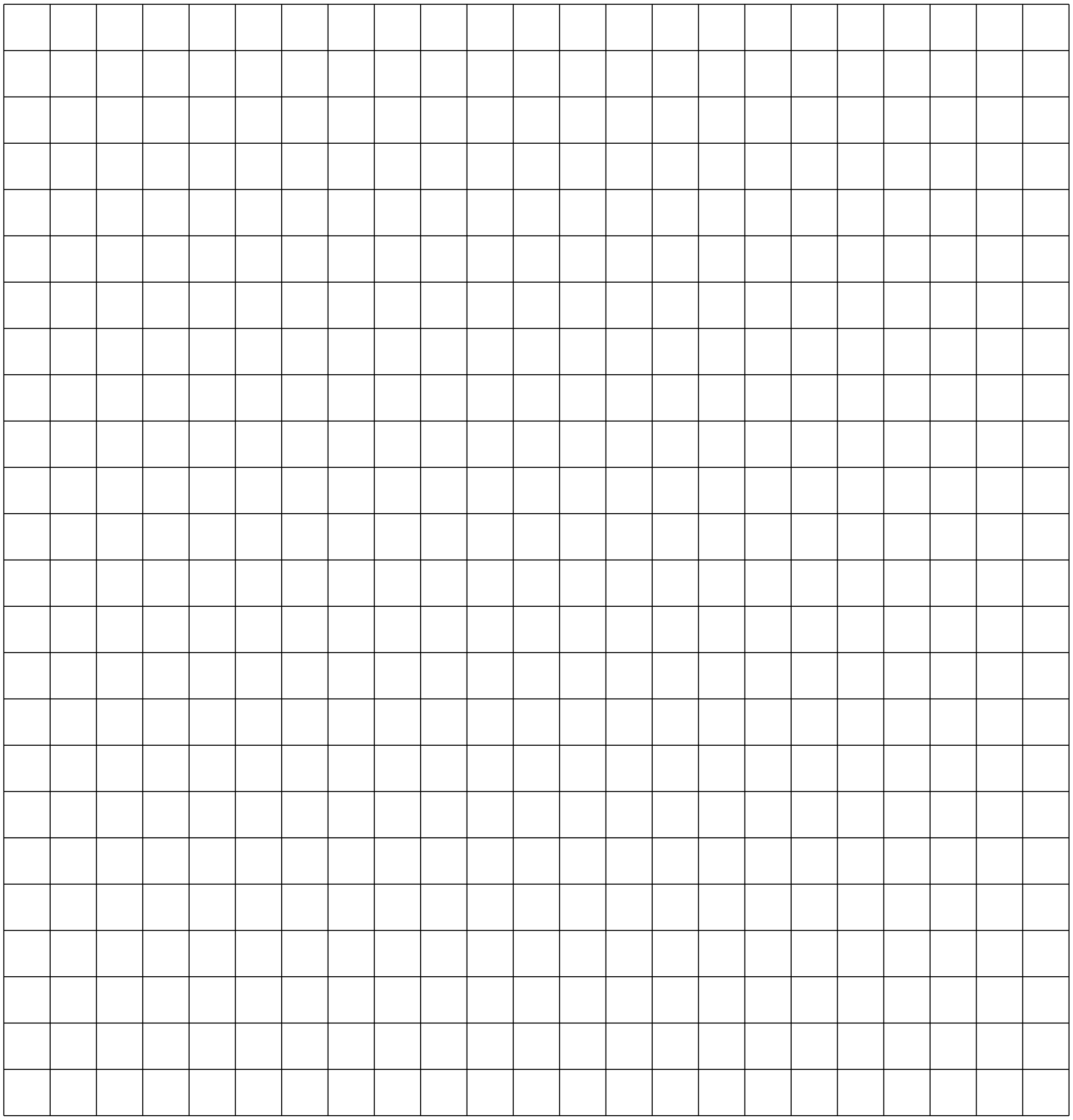
Scale: 1/4 inch = 1 foot



60SP016A
12/20/99

Figure H-13 Computer Floor Template

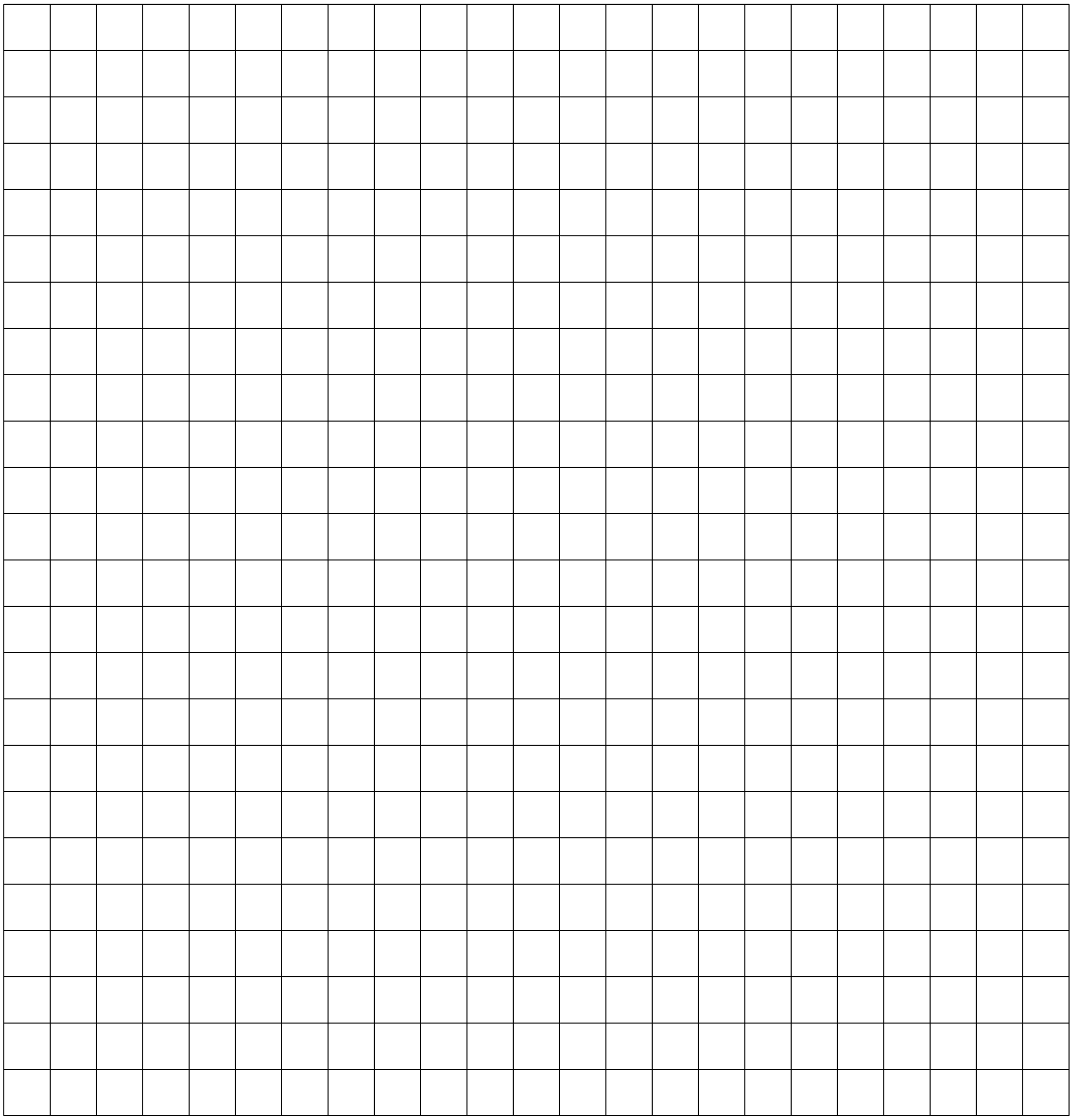
Scale: 1/4 inch = 1 foot



60SP016A
12/20/99

Figure H-14 Computer Floor Template

Scale: 1/4 inch = 1 foot



60SP016A
12/20/99

I Declarations of Conformity and Similarity

Figure I-1 Declaration of Conformity - Page 1

DECLARATION OF CONFORMITY

according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name: Hewlett-Packard Company
Address: 3000 Waterview Parkway
Richardson, Texas 75080, USA

declares that the product

Product Name(s): Superdome, hp Integrity Superdome, hp 9000 Superdome (HP High Performance SMP Server)
Model Number(s): SPP5, [Marketing nomenclature: Model 16, SD16000, Model 32, SD32000, Model 64, SD64000]
Base Product Number(s): A5200A, A5201A, A5202A, A6113A, A6445A, A6862A, A6864A, A6864AX, A6866AX, A6866BX, A6866CX, A6868AX, A6888AX, A6924AX,
Product Option(s): All

conforms to the following Product Specifications:

Safety: IEC 60950-1:10/2001 1st Edition (with national differences for the countries & areas listed on page 2)
EN 60950-1:12/2001; Part 1: General requirements
UL 60950-1:1/2003, 1st Edition; BI-National Standard with CSA
CAN/CSA C22.2 No. 60950-1; 1st Edition; BI-National Standard with UL

EMC: CISPR 22:1997 / EN 55022:1998; +A1:2001, Class A

EN 55022:1998,	30 MHz to 5.56 GHz, Class A	Radiated Emissions
EN 55022:1998,	150 kHz to 30 MHz, Class A	Conducted Emissions
EN 55024:1998		Immunity for ITE
EN 61000-3-11:2000 / IEC 61000-3-11:2000		Voltage Fluctuation/Flicker
EN 61000-4-2:1995,	8kV CD / 15kV AD	ESD
EN 61000-4-3:1996,	100 kHz-10GHz, 10 V/m, 1kHz AM	Radiated Immunity
ENV 50204:1995,	900MHz, 1.89GHz, PM, 10 V/m	Radiated Immunity
EN 61000-4-4:1995,	1kV Power line, 0.5kV signal cables	EFT
EN 61000-4-5:1995,	2kV CM, 1kV DM	Surge
EN 61000-4-6:1996,	150MHz - 400MHz, 3 V_{rms}, 1kHz AM	Conducted Immunity
EN 61000-4-8:1993,	3 A/m, 50Hz	Magnetic Immunity
EN 61000-4-11:1994,	11V_{rms} (10ms), 161V_{rms} (0.5s), 11 V_{rms} (5s)	Voltage Dips/Interrupts

Supplementary Information:
The product as stated above complies with the requirements of the Low Voltage Directive 73/23/EEC, and the EMC Directive 89/336/EEC, as amended by 93/68/EEC.

Date: September 10, 2004

Cecil Clayton

by: Cecil Clayton III
Hewlett-Packard Company
Product Regulations Manager

Figure I-2 Document of Conformity - Page 2

invent

DECLARATION OF CONFORMITY

according to ISO/IEC Guide 22 and EN 45014

FCC Regulations (USA Only)

The Federal Communications Commission (in 47 CFR Part 15) has specified that the following notice be brought to the attention of the users of this product

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense

The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance (Hewlett-Packard) could result in the equipment being non-compliant with the FCC Class A requirements and void the user's authority to operate the equipment

Additional International Approvals

AS/NZS 3548:2002 C-Tick & Supplier Code (N279)	Australia/New Zealand
ICES-003 Issue 4:2004	Canada
IEC 60950:1991 +A1 +A2 +A3 +A4 +A11	International
GB4943-2001	China
GB9254-1988	China
VCCI/CISPR22:1997 Class A	Japan
MIC No. 1996-18, Class A	Korean
BSMI, CNS-13438 11/94 (Rev. 5/97)	Taiwan

IEC 60950-1 and IEC 60950 Evaluated National Differences for the following countries and areas.

CENELEC, AT = Austria, AU = Australia, BE = Belgium, CA = Canada, CH = Switzerland, CN = China, CZ = Czech Republic, DE = Germany, DK = Denmark, ES = Spain, FI = Finland, FR = France, GB = United Kingdom, GR = Greece, HU = Hungary, IE = Ireland, IL = Israel, IN = India, IT = Italy, JP = Japan, KR = Republic of Korea, NL = The Netherlands, NO = Norway, PL = Poland, RU = Russia, SE = Sweden, SG = Singapore, SI = Slovenia, SK = Slovakia, TR = Turkey, UA = Ukraine, US = United States, ZA = South Africa

European Contact: Your Local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE / Standards Europe, Herrenberger Strasse 140, D-71034 Boeblingen, Germany (FAX +49-7031-14-3143) Rev. 9/10/2004 SPP5 Page 2 of 2

Figure I-3 Declaration of Similarity

HEWLETT® PACKARD

Hewlett-Packard Company
PO Box 833851
Richardson, TX 75083-3851

To: Certification Body

July 17, 2003

From: Hewlett Packard Company
Regulatory Engineering Department
3000 Waterview Parkway
Richardson, TX 75080
USA

**Declaration of Similarity (DoS)
for
Product Families**

We, the undersigned manufacturer, herby confirm that the following models are identical in all electrical safety and electromagnetic aspects from the regulatory point of view.

Model Name	Model Numbers	Product Part Numbers
HP 9000 SuperDome (SPP5) Enterprise Server	SPP5 - SD16000, SD32000, SD64000	A5200A, A6113A, A5201A, A5202A, A6445A,A6862A,A6866AX,A6866BX, A6924AX, A6864AX

Supplementary Information:
The SuperDome server is a new product family. The A5200A represents an unconfigured unpopulated system. Each of the next following Product Part Numbers correspond to a Model Number representing changes in the amount of memory and processors. All models are identical in all electrical and physical aspects. The SD16000 (A6113A) represents a 16 way capable base configuration where the main backplane is partially populated. The SD32000 (A5201A) represents an upgrade to a 32 way capable base configuration where the backplane is fully populated. And the SD64000 (A5201A + A5202A) represents individual systems networked together. The A6445A represents the upgraded 750MHz Microprocessor Cell board. The A6862A represents the upgraded 875MHz Microprocessor Cell board. The latest Cell/Power Board design (with 1.5GHz –Itanium Microprocessors) is a product enhancement to complement the existing 875MHz Microprocessor. This new Cell/Power Board design has separated the power and microprocessor section, due to weight constraints.The new Cell/Power board design consists of a separate Power Board A6866AX , which mates to the Cell board A6866BX(w/o Microprocessors installed). With Madison IA (1.5GHz)Microprocessors installed in the Cell bd., the p/n changes to A6924AX. The latest version of SuperDome also incorporates PCIX chassis's (A6864AX), which is the most current I/O industry standard.

Cecil Clayton
Cecil Clayton
Product Regulation Manager
High Performance Systems Lab
Date: July 14, 2003

John Ngo
EMI Operations Manager
National Technical Systems, Plano, TX
Date: July 14, 2003